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Cast-Iron Pipe Manufacture in the South

Continuous Operation and Other Innovations Have Put the Industry on a New Basis of Economic Production

BY Y. A. DYER

There is no branch of the foundry trade in the South that has forged ahead with such speed of manufacture under the adoption of improved methods as the high-pressure cast-iron pipe industry. The consumption of this class of pipe in the United States in round numbers is 1,000,000 tons per annum. Of this quantity, 33 1/3 per cent is manufactured within a radius of 75 miles of Birmingham,

1909 to 1914, the productive capacity for the manufacture of bell and spigot cast-iron pipe increased 16 per cent, while the consumption of such pipe increased only 9 per cent. No explanation of this situation is given in the Government's report, but the explanation made by manufacturers is that much of the present plant capacity was provided to care for an accumulated demand made possible

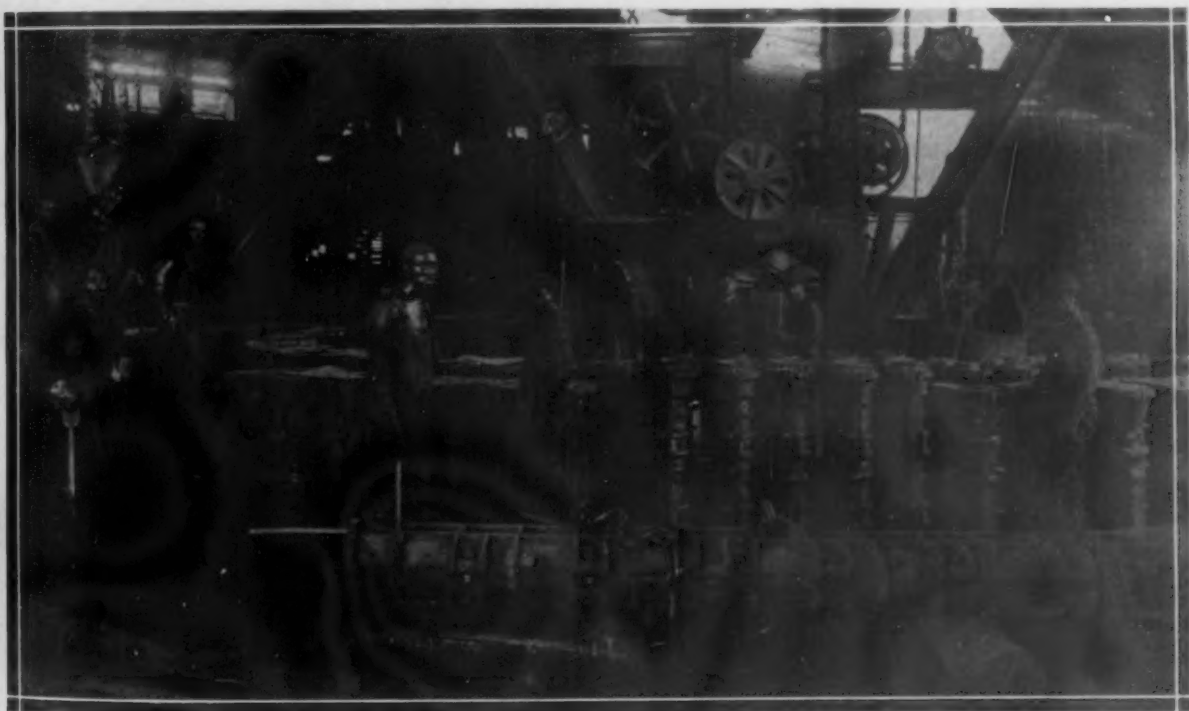


Fig. 1—General View of Modern Cast-Iron Pipe Plant

ham, Ala., and about 50 per cent of the total is manufactured in the South proper.

The present state of high efficiency in the manufacture of pipe has necessarily been a system of eliminations and innovations, and by the very nature of the business it has had to work itself out of the small unit class into large productive capacity and extensive organizations in order to cope successfully with the demands of modern times. As illustrating the progress made in the manufacture of pipe and the present tendency, recent Government statistics disclosed a rather remarkable condition of affairs. During a period of five years, from

by towns and cities which had sprung up in various parts of the country in rather "mushroom-like" manner. Some of these towns and cities had poor water and gas works and some of them had none. A wave of civic pride and public necessity seemed to sweep the country, and in centers of population where it was possible gas and water-works systems were installed. As a consequence, for a while there was an enormous demand for pipe material, and small unit plants sprang up at various places without much reference to the supply of raw material or labor. This demand has now been largely supplied, and at the present time there are not so

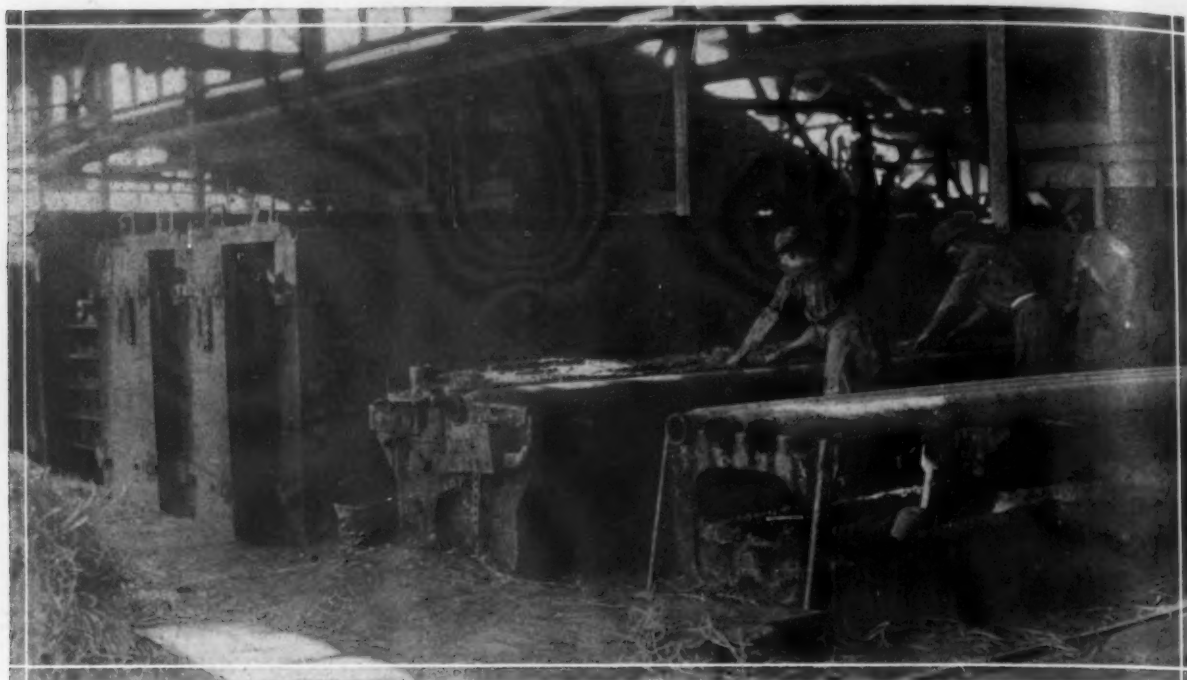


Fig. 2—Making 16-Ft. Cores

many new pipe installations as there are enlargements and extensions of existing plants.

Most of the early pipe plants were small, and only built with the idea of taking care of local or sectional demand. The tendency now in the cast-iron pipe industry is to concentrate on larger plants. Fig. 1 gives a general view of modern cast-iron pipe pit served by three-motor jib cranes. This is one of a series of pits which contain two sets of molds, A and B, and are operated continuously day and night, producing four times the average output of nine years ago. This is an innovation that keen competition has brought into existence, and as a result the smaller unit plants are gradually disappearing, and the business is being concentrated in the plants most favorably located with reference to material and labor. It is generally understood that the largest pipe interest in the country has adopted in recent years the policy of concentration in a few large units, and is gradually abandoning some of its small and poorly located plants. One of these large units is located in the Birmingham district, the original plant having been rebuilt entirely on ampler lines.

It has long since been proved that the lowest cost and highest efficiency can only be obtained by large output. Realizing this necessity, and in order to meet it, one of the pipe plants in the Birmingham district began several years ago to experiment on the plan of continuous operation. Finally, such



Fig. 4—Setting Cores

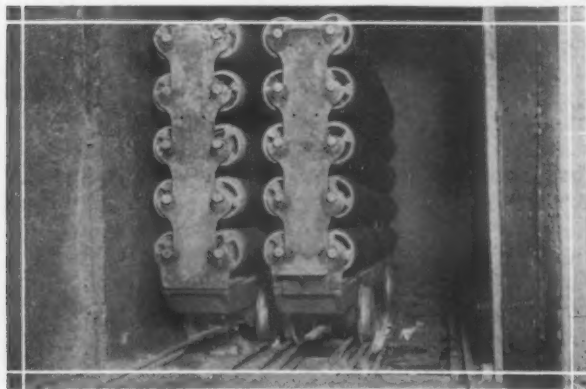


Fig. 3—Gas-fired Core Oven

changes in equipment and organization were effected as to make possible day and night operation—from Monday morning until midnight Saturday—and this system has been in effect for the past five years. Thus a new pace was set, and there is no question that the successful pipe plant of the future will have to be built for continuous operation.

The larger plants are developing engineering organizations which are creating and putting into effect modern efficiency methods of manufacture, going into all possible economies. Fig. 2 shows the making of 16-ft. cores for the manufacture of



Fig. 8—Welfare Sleeping Quarters



Fig. 5—Drawing Patterns

16-ft. length pipe. Here is another innovation in the method of manufacture put into effect by one of the large cast-iron pipe interests of the Birmingham district. The standard length since foundries first began to cast pipe vertically has been 12 ft., yet 35 per cent of the sales of this company for the present year have been of 16-ft. pipe. The adoption of the 16-ft. length was a logical step in the development of the industry and the economies that have resulted are too obvious to require amplification. It can be readily seen that it has effected the saving of every fourth joint and the

cost of material and labor necessary to make the joint.

Hay for the making of cores has been replaced by excelsior for the larger cores, and a mixture known as "skilley" for the smaller cores. This last-named core preparation, made largely of disintegrated waste paper, mechanically adheres to the heated core barrels, thereby making it unnecessary to dry the first coating in the core oven.

The modern pipe company has a gas-producing plant and overhead mains leading to all points in the foundry for the distribution of gas to the core ovens, pits, etc. This advanced practice has replaced the old method of building coke fires under the molds and core ovens. Coke braize is used as fuel in the manufacture of water gas. The core oven in Fig. 3 is fired with gas.

Figs. 4, 5 and 6 illustrate the method of drawing patterns, setting cores, and shaking out pipe. As will be noticed, this work is largely performed by electric cranes, which have been developed to the highest state of efficiency.

The charging of cupolas by the old "rule of thumb" method has given way to the analysis basis. The charges are apportioned according to chemical analysis of the various pig irons and scrap metal used, and all heats are subjected to chemical analysis and physical tests in the laboratory, thereby minimizing shop losses and producing maximum quality metal. The antiquated and expensive scrap screening method for the reclama-

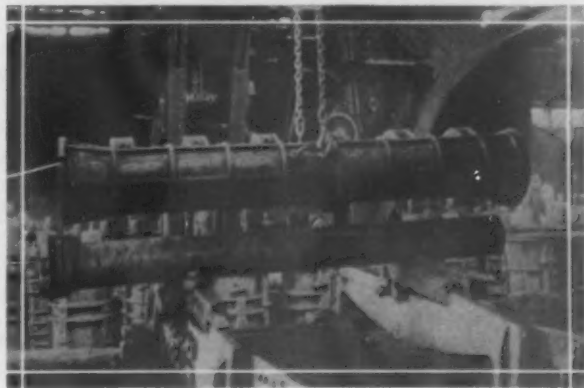


Fig. 6—Shaking Out Pipe

tion of sprues, shot iron, etc., has been replaced by mechanical methods. The overcoke, skull and slag iron are run through a mechanical washing plant and separate reclamations made. The shot iron and sprues are separated from the sand by electric concentrators.

Fig. 8 shows the advanced method of loading pipe from the yard, or "acres of pipe," as familiarly known around the plant. This mechanical innovation has replaced the old, slow and expensive hand-skidding method.

By the very nature of pipe manufacture, it is an uncomfortable work—largely due to excessive heat and dust. For this reason it has always been a difficult task to engage and retain steady, satisfied, competent labor. The inauguration of welfare departments has contributed very materially to the solving of this problem, and this work is now considered a potent factor in the operation of a pipe

the employees. Therefore, on account of these tendencies toward larger output, improved methods of manufacture and the providing and maintenance of welfare institutions—all needed to insure an adequate supply of trained and efficient men—the capital necessary for engaging in such business will be increasingly larger in order to keep pace with the future developments.

The Lyons Sample Fair

A committee representing some of the strongest business interests in the United States has been formed to further and foster American exports by means of the Sample Fair or exposition to be held in Lyons, France, in March, 1917. Working with the American organization are committees in France, Great Britain, Italy, Spain, Russia, Switzerland and other allied and neutral countries, whose aim it will be to bring together manufacturers and wholesale buyers from all over the

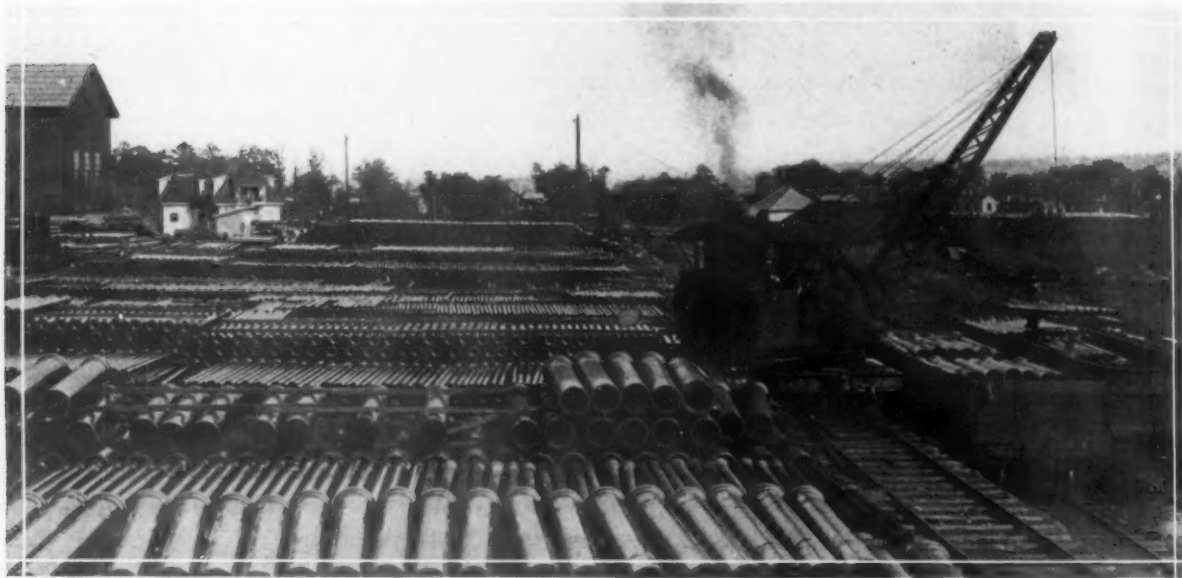


Fig. 7—Loading Pipe from Yard

plant. Fig. 7 is a view in the welfare building at a large plant in the Birmingham district. In these sleeping quarters a bed is to be had at "5c. per night, or 20 sleeps for 50c." The welfare buildings are equipped with shower baths and lockers, lunching, reading, recreation and airy sleeping quarters for both white and colored labor. The same plant has an operating room and a medical dispensary. For a charge of 50c. per month for single men and \$1 per month for married men, all medicines are supplied to employees, as well as the services of physician, surgeon, dentist and trained nurses. The families of employees are also cared for under the same charge.

In recent years, cast-iron pipe manufacturers have instituted an educational campaign, working through what is known as the Cast Iron Pipe Publicity Bureau. This bureau is vigorously stressing the lasting qualities of cast-iron pipe compared with other materials for like purposes, its corrosion resisting qualities, etc.

Still further economies and innovations are under consideration in the pipe industry, such as the transfer of hot metal direct from the blast furnace in hot pot ladles to a mixer plant at the pipe shop, thereby making possible a substantial saving in the cost of remelting at least one-half of the metal that is to be poured. There are also the plans for the laying out of model industrial cities and the building of comfortable and economical homes for

world. In March of this year the Fair had 1342 different exhibitors, but not a single American manufacturer was represented, and it is now hoped to correct erroneous impressions that were entertained as a result. At the last exposition over \$10,000,000 in actual wholesale business was done, and \$8,000,000 more was refused because of inability on the part of manufacturers to make deliveries. The expenses of an exhibit are stated to be small. The booths are open to wholesalers only.

The American Committee was organized by M. P. Peixotto, president American Chamber of Commerce in Paris, and Francis E. Drake of Paris, who came to this country for that purpose. Headquarters have been opened at 1790 Broadway, New York. The committee consists of the following:

- Henri E. Gourd, president French Chamber of Commerce of New York.
- A. E. Outerbridge, president New York Chamber of Commerce.
- E. M. Herr, president Manufacturers' Export Association.
- William Fellowes Morgan, president Merchants Association of New York.
- C. F. Weed, president Boston Chamber of Commerce.
- William M. Coates, president Philadelphia Board of Trade.
- Edwin Denby, president Detroit Board of Commerce.
- Col. William B. Melish, president Cincinnati Chamber of Commerce.
- F. J. Koster, president San Francisco Chamber of Commerce.
- Robert Garland, president Pittsburgh Chamber of Commerce.
- Frank B. Baird, president Buffalo Chamber of Commerce.
- William Sheldon, president Minneapolis Civic and Commerce Association.
- George B. Van Cleve, chairman Van Cleve Company of New York.

STATUS OF NAVAL AWARDS

Four Battleships and Fourteen Destroyers Thus Far Awarded

WASHINGTON, D. C., Nov. 21, 1916.—As the result of a series of conferences between the Secretary of the Navy and representatives of the leading shipyards of the country, held at the Navy Department the past week, it has been decided to award contracts for two of the four battleships authorized by Congress to the New York Shipbuilding Company and for the other two to the Newport News Shipbuilding & Dry Dock Company. It has also been decided to allot eight of the 20 destroyers to the Fore River Shipbuilding Corporation, Quincy, Mass., and six to the Union Iron Works, San Francisco, Cal. Four of the destroyers were some time ago awarded to the Bath Iron Works, Bath, Me. It has not yet been determined whether the remaining two destroyers shall be built by contract or at a navy yard.

It is believed that a basis will be secured upon which contracts can be let within the statutory limit of cost for the 29 submarines included in the new construction program. The joint efforts of the officials of the Navy Department and the shipbuilders have failed, however, to devise a method by which the plans of the four 35-knot scout cruisers could be so modified as to bring their cost within the appropriation without sacrificing essential features in their construction. Secretary Daniels has therefore confirmed the intimation in this correspondence last week that Congress will be asked to increase the limit of cost of these vessels and presumably to embody the authorization in the urgent deficiency bill, which will be the first appropriation measure to be taken up.

ELECTRIC DRIVE ON BATTLESHIPS

The bids submitted for the four battleships were all unsatisfactory to the Department for one or more reasons, although a sufficient number were within the cost limit to permit contracts to be awarded. The chief bone of contention between the Department and the builders was the power plant, the experts of the Bureau of Steam Engineering having committed themselves unreservedly to the electric drive system. The representatives of the shipyards expressed their entire willingness to install electric systems but not to guarantee the satisfactory performance of the ships, stating frankly that they were without experience with this style of drive. The Secretary of the Navy took the position that the Department could not under the law accept the vessels on the basis of dock trials and must insist that the contractors assume full responsibility for the speed and general performance of the vessels. He also drew attention to the fact that the leading electrical companies were prepared to guarantee the engines built by them, three of which are now being installed in battleships under construction in Government navy yards. After much discussion, and when it had been made clear that the Department under no circumstances would change the type of propulsion, representatives of the New York Shipbuilding Company and the Newport News Shipbuilding & Dry Dock Company agreed to build two battleships each in accordance with the Department's plans and to give the desired guarantees.

GOVERNMENT ASKED TO CARRY OWN INSURANCE

Practically all the bidders for destroyers objected to the Government's form of contract, and the Department therefore solicited from each yard submitting proposals suggestions for the revision of the standard contract form. Most of the objections were technical, but in addition nearly all bidders for these and the other vessels drew the Department's attention to the difficulty of securing adequate insurance and suggested that in view of the size of the present building program the Government might well carry its own insurance. In the case of a battleship certain bidders reported that it was impossible to find companies willing to write full indemnity, while premiums on the amounts of avail-

able insurance were put at prohibitory figures. It was pointed out that, inasmuch as the item of insurance must be included in the contract price, the Government could easily figure the advantages of carrying its own insurance. This interesting question will receive further consideration.

The obstacle to the prompt awarding of contracts for the submarines, for which an adequate number of bids within the cost limit were received, has been the great variety of stipulations added by the bidders to the usual form of proposals. The Government is anxious, in view of the large number of vessels of this type that will undoubtedly be purchased in the future, to standardize plans, specifications and contracts; hence it has been decided to lay the proposals for the 29 submarines, two of which will be of a sufficient size to accompany fleets on extended cruises, before the Naval Board of Review composed of Admiral Benson, Chief of Operations, Chief Constructor Taylor and Engineering Chief Griffin. The bidders for the submarines have already conferred with the board and will hold other consultations from time to time.

Officials of the Navy Department are sanguine that Congress will grant the additional appropriation for the scout cruisers, and in asking for these funds the refusal of the shipbuilders to present bids within the cost limit will be inferentially defended on two grounds: First, because of the rapid increase in the cost of materials and labor since the plans for these vessels were prepared, and, second, because of the technical difficulties presented by the enormous power plants which are the largest the Government has ever undertaken to install in vessels of equal tonnage. The Department appears recently to have adopted a new and altogether commendable policy of refraining from criticising shipbuilders and manufacturers of material because of their inability to control the upward trend of prices which has marked every enterprise dependent in any way on the iron and steel industry during the past 18 months. In fact, the officials have been at pains the past week to express their appreciation of assurances received from representatives of the United States Steel Corporation and other producers of structural steel, plates, etc., that Government requirements will receive their best attention and will be given precedence wherever possible.

W. L. C.

Bids and Awards for U. S. Shells

Bids were received by the chief of the Bureau of Ordnance, Navy Department, Washington, for furnishing 4800 14-in. armor-piercing projectiles, and 2800 14-in. class B projectiles, as follows:

The Midvale Steel Company, Philadelphia, 2000 14-in. armor-piercing, \$535 each; 500 class B projectiles, \$332 each.

The Bethlehem Steel Company, South Bethlehem, 3000 14-in. armor-piercing shells, \$545 each; 2800 class B projectiles, \$310 each.

The Crucible Steel Company, Pittsburgh, 3000 14-in. armor-piercing shells, \$539.50 each; 500 class B shells, \$308 each.

The Washington Steel & Ordnance Company, Washington, 1000 14-in. class B shells, \$320 each.

The following bids were opened by the commanding officer, Frankford Arsenal, Philadelphia, under proposal 157, Nov. 4, for furnishing 23,950 common steel shells for 6-in. siege howitzer: Item 1, prescribed hydraulic test to be made by contractor under Government inspector; item 2, hydraulic test by Government:

The Bethlehem Steel Company, South Bethlehem, item 2, \$20.78 each, completed Dec. 31, 1917; awarded 12,000.

The E. W. Bliss Company, Brooklyn, item 1, \$22.50 each, delivery, 11,950 in April, 1917; 12,000 in May, 1917; accepted for 11,950.

The Tredegar Company, Richmond, item 2, \$31.25 each, delivery by Jan. 1, 1918.

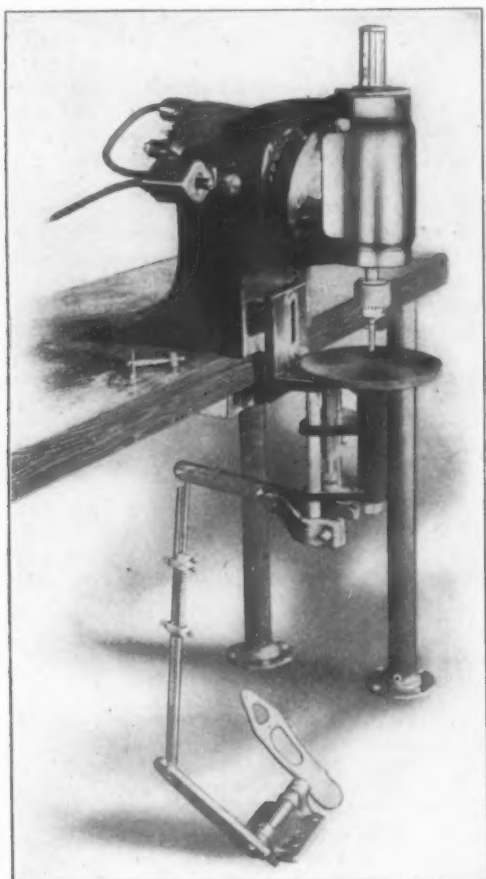
The Washington Steel & Ordnance Company, Washington, item 1, \$39.50 each, on 12,000 only, manufactured by boring from solid forgings, delivery complete in 200 days after order.

The Bullard Machine Tool Company, Bridgeport, Conn., has joined the list of manufacturing establishments which have taken out insurance for their employees. The aggregate amount is over \$500,000.

A Vertical Tapping Machine for Dies

A die-tapping machine in which the cutting speed can be varied without affecting the time per operation has been developed by the Anderson Die Machine Company, Bridgeport, Conn. This result is secured by increasing the speed at which the tap is reversed to compensate for the necessarily slower rate at which it does its work. The machine is motor driven and the power is supplied from an adjacent lighting socket.

High-carbon steel, which is first turned and then finished by grinding, is employed for the spindle. S. K. F. radial ball bearings are used for both the top and bottom spindle bearings. The inner ball race in which the spindle moves up and down has been increased in length by forcing a high-carbon steel sleeve $1\frac{1}{2}$ in. long into it. The friction disk driving the spindle has a spherical face and is mounted directly on the armature shaft of the motor. This arrangement eliminates all intermediary transmission devices, the spherical face being relied upon to overcome the slipping tendency sometimes found where a flat face friction operates on a flat disk. The weight of the spindle and the various related parts is balanced by a spring at the



A Vertical-Spindle Machine for Tapping Dies in Which the Increased Speed of Reversal Compensates for the Slower Cutting Rate and Gives a Constant Time for Each Operation

upper end, which is capable of adjustment and is inclosed to eliminate danger to the operator.

The driving motor can be of any standard type provided it does not exceed 6 in. in diameter, and two brackets or lugs are provided for mounting it. The motor is pivoted in the frame of the machine on the center of the spherical face of the friction disk driving the spindle. Tilting the motor is relied upon to give various cutting and return speeds, it being pointed out that if the speed is reduced in one direction it will be increased in the opposite one. If, for example, the motor is placed to give a

spindle speed of 1000 r.p.m. in either direction, the sum of the two is 2000 r.p.m. If the motor is tilted to provide a cutting speed of 500 r.p.m., the reverse movement will be at the rate of 1500 r.p.m. If the rate of tapping is reduced still further to 250 r.p.m., the tap will be reversed at 1750 r.p.m., thus maintaining the combined figure of 2000 r.p.m. and enabling the tapping speed to be varied without affecting the time required to complete an entire operation.

The work table of the machine is circular in form and measures 7 in. in diameter. A movement of $1\frac{3}{4}$ in. on two way-rods spaced far enough apart to give a rigid and easy movement is provided, and there is an adjustment of 3 in. for the way-rods and table, which is relied upon to give space between the chuck and the table when fixtures and lugs are employed. As was the case with the spindle, a spring under the table is employed to balance the weight. As it is capable of adjustment, the movement toward and away from the tap is made sensitive for the use of small tools. The table is operated by a foot treadle which, if desired, can be removed readily by simply loosening a single screw. The connection from the floor to the machine is adjustable, and a safety spring, which is relied upon to prevent the lead of the tap from being disturbed by the sudden application of pressure on the treadle, is furnished. The treadle is located 8 in. away from the center of the machine, so that the operator's knees will not be interfered with.

A large-diameter hollow column supports the table. This interior chamber is filled with oil into which the tap dips when through holes are being threaded. In this way the tap is lubricated, and in addition, it is pointed out, the chips are washed off so that the thread will not be injured when the tap is backed out through the work. The oil level is maintained as the chamber becomes filled with chips, and when these become too numerous the chamber can be cleared by removing the plug at the bottom.

The following table gives the principal dimensions and specifications of the machine:

Minimum size of tap, in.....	1/16
Maximum size of holes tapped in cast iron, in....	3/4
Maximum size of holes tapped in steel, in....	3/16
Depth of holes, in.....	1 1/2
Distance between spindle center and slide, in....	4
Diameter of spindle, in.....	3/4
Diameter of table, in.....	7
Vertical adjustment of table, in.....	3
Size of motor, hp.....	1/6
Speed of motor, r.p.m.....	1,750
Current consumed, amp.....	2
Net weight, lb.....	115
Domestic shipping weight, lb.....	175
Export shipping weight, lb.....	200
Size of case, cu. ft.....	8

The equipment furnished with the machine includes a switch of special design, a reinforced cord, an attachment plug, the necessary wrenches, guards to protect the operator from personal injury and oil which might soil his clothing and a chuck. Unless otherwise ordered the last is of the two-jaw positive drive type.

The Champion Iron Works, Kenton, Ohio, is placing on the market a complete line of electric traveling cranes. The cranes have been designed by R. W. Valls, who is now engaged with the Kenton plant as engineer and designer. He was formerly employed in a similar capacity by the Shaw Crane Company, Muskegon, Mich., and recently severed his connection with that company to take a position with the Champion. The Biggs-Watson Company, Guardian Building, Cleveland, will have the exclusive selling agency of the Champion Iron Works cranes.

Heavy-Duty Vertical Drilling Machine

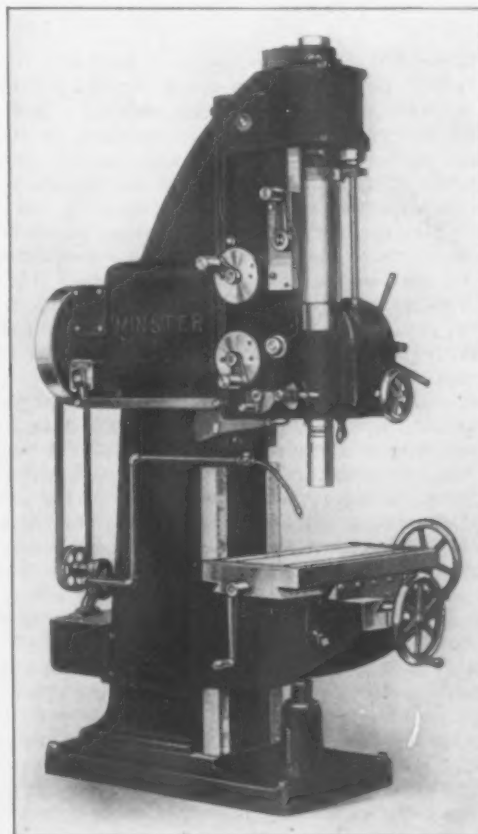
A vertical drilling machine equipped with a plain table and designed for heavy-duty work has been placed on the market by the Minster Machine Company, Minster, Ohio. It is designed to drive a 2½-in. high-speed drill in solid steel at speeds and feeds in keeping with modern shop practice. A large number of changes for both are provided which enables the machine to handle a wide range of work. It is thus possible to drill small holes at high rates of speed, as well as to handle heavy work such as enlarging holes in steel and cast iron.

The machine is driven through a single pulley 20 in. in diameter with a 3½-in. face at a constant speed of 550 r.p.m. From this shaft the drive is continued through stub tooth transmission gearing to the main spindle. A gear box of rather simple construction provides six initial changes through sliding gears, the engagement of the various ones being controlled by the two cranks engaging the holes in the dials on the left side of the head. The crank handle, mounted on the rectangular block in front of and slightly above the upper dial, engages the direct drive or the back gear and thus doubles the number of speeds available to give 12 changes in all, ranging from 30 to 550 r.p.m. All of the high speeds are obtained through a smaller gear on the spindle sleeve which, it is pointed out, does away with tooth velocities in excess of 800 ft. per min. The lever below the speed dials operates an expanding band friction inside the gear box which, together with the transmission gears, runs in oil. The direction of the rotation of the drill spindle is controlled by the up and down movement of this lever, thus, it is pointed out, giving a convenient braking device as well as a tapping attachment. The oil in the gear box is circulated over the gears by a gravity feed system of oiling, and an opening in the gear box closed by an oil-tight cover provides a means for adjusting the driving friction readily.

The transmission is of either the rear or side drive, as may be specified by the purchaser, and either style can be applied without difficulty even after the machine has been placed in service. When the side drive is employed, the upper plate at the rear of the main housing is removed to provide room for a flanged bearing carrying the side drive pulley mounted on annular ball bearings. The entire transmission gear box, including the rear or side drive arrangement, the tapping attachment and the six initial gear changes, are contained in a single casing fastened to the back of the main housing and having the forward end pilot directly into the main head casing. The main spindle drive consists of a sleeve 4 in. in diameter and 24 in. long driven directly by gearing. Wide and deep keyseats at diametrically opposite points on the sleeve engage two hardened driving keys mounted into the driving head and keyed rigidly to the main spindle, but at the same time capable of vertical movement within the sleeve. This arrangement is relied upon to overcome binding of the spindle when sliding under heavy pressures. The spindle is a piece of high-carbon steel, with a minimum diameter of 2¼ in., finished by grinding and provided with a ball thrust bearing. It is bored to receive a No. 5 Morse taper socket and is cross-slotted at the end for heavy driving.

For regular work 12 feed changes, ranging from 0.006 to 0.069 in. per revolution of the spindle, are provided. This gearing is of the steel stub tooth type, located within a feed box cast integral with the head at the right of the spindle, and is of

the sliding gear type, no pull pins being used. From the gear box power is transmitted to a large worm-wheel keyed to the pilot shaft at the right of the spindle, upon which is cut a coarse, wide-face pinion engaging a rack cross-keyed to the spindle sleeve. The changes are obtained by small levers and an index plate designates the proper position



Vertical Drilling Machine Equipped with a Plain Table and Either Rear or Side Drive

for both the feeds and speeds. An automatic knock-out is provided to serve as a depth gage for drilling, while a safety stop is relied upon to prevent the spindle from feeding beyond its proper traverse. Pilot handles are provided for rapid traverse of the spindle. If it is necessary to suit the feed to some special lead for a particular piece of work, the gearing mounted upon a swinging quadrant at the upper end of the spindle sleeve is changed.

The plain table illustrated has a working surface measuring 20 x 26 in. with an oil groove. The table has a vertical adjustment of 18 in., secured by telescopic screws, and is gibbed to a wide bearing on the housing. Provision is made to pass a 3-in. boring bar entirely through the table. If desired, a compound table measuring 17 x 38 in. over all can be supplied. This is of heavy construction and gibbed to provide for wear. A tongued taper gib adjusted from the front is provided for the cross-saddle, and all adjustments are made by screws of 1-in. lead provided with micrometer collars and large handwheels and engaging bronze nuts. The compound table adds 600 lb. to the net weight of the machine, which is 5300 lb. An oil pump, reservoir and the necessary flexible steel tubing for a lubricating system can be supplied at an extra cost, and motor drive can also be furnished for either the rear or side driving arrangement.

The Wellman-Seaver-Morgan Company, Cleveland, has taken an order from the Alan Wood Iron & Steel Company, Philadelphia, for a standard car dumper.

The Electric Motor in the Steel Mill*

The Dangers Which May Arise from Improper Control Arrangements of Mechanically Connected Direct-Current Motors

BY H. F. STRATTON†

MECHANICALLY connected motors are those in which any change in speed of rotation of any one motor must be accompanied by the same proportionate change in speed of rotation of each of the other motors, and also, a change in the direction of rotation of any motor must be accompanied by a change in direction of rotation of each of the other motors. The majority of cases claiming attention include two or more motors of the same horsepower and speed, all rotating in the same direction at the same time. The mechanical connection between motors may consist of gearing, pulleys and belts, sheaves and cables, or it may be through track and track-wheels as on the bridge motion of a traveling crane.

Steel mills furnish frequent illustration of two or more mechanically connected motors, and it is logical to inquire why preference is given to several mechanically connected motors instead of one large motor having a horsepower rating equivalent to the sum of the smaller motors. In some cases, two or more motors have been used because the frame of the smaller motors fitted more easily in the available space or that it appeared to be considerably easier to change armatures. Sometimes the horsepower requirements are quite large, and if one large motor instead of several small ones were used, it might introduce into the mill an entirely new size of motor, thereby complicating the spare part situation.

Another reason for the use of two or more mechanically connected motors is the need of continuing to operate some machine, if one of the motors burns out. In this case the remaining motor, or motors, are made of sufficient capacity to maintain operation, although perhaps at a reduced speed. A metal mixer is a good illustration of a machine coming under this classification, as it is obviously necessary to be able to tilt the mixer even if one motor is disabled. The hoist on a ladle crane is another common illustration of the same character.

MOTOR TROUBLES

The practice of using two or more mechanically connected motors in the place of one large motor has raised

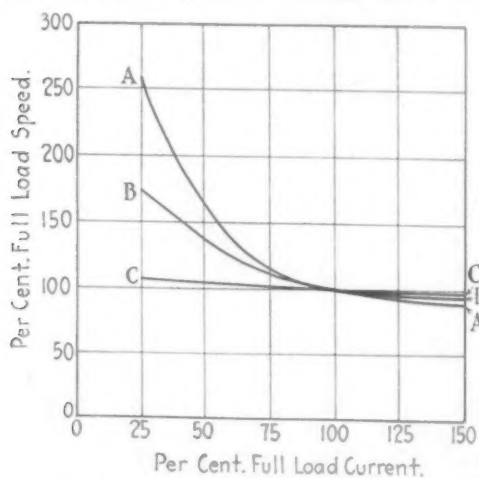


Fig. 1—Relation Between Speed and Current of Various Types of Motors. AA—Series motor. BB—Compound motor. CC—Shunt motor.

new difficulties. Some of these can easily be explained by theoretical considerations; others, however, are brought to our attention forcibly only by the difficulties

experienced in service and sometimes it is puzzling to find the true explanation of the difficulties which have developed. I suggest that we consider first the electrical problems which are very largely the questions of circulating currents and the unequal division of the total motor current.

The general equation of a direct current motor is: The speed rotation is equal to the voltage divided by the product of the number of effective armature conductors and the amount of magnetic flux which is cut by these conductors. Curves for series, shunt, and compound motors are presented herewith, illustrating the change in motor current with change in speed. The speed changes least in the case of shunt motors, more in the case of compound motors, and most in the case of series motors.

In Fig. 1, curve AA represents the relation between speed and current in the case of a series motor, BB in the case of a compound motor, and CC in the case of a shunt motor. These are curves expressing current as a function of speed; it must be remembered that such a curve represents only approximately the performance of any given motor, and as a matter of fact the speed-current curves of different motors—although

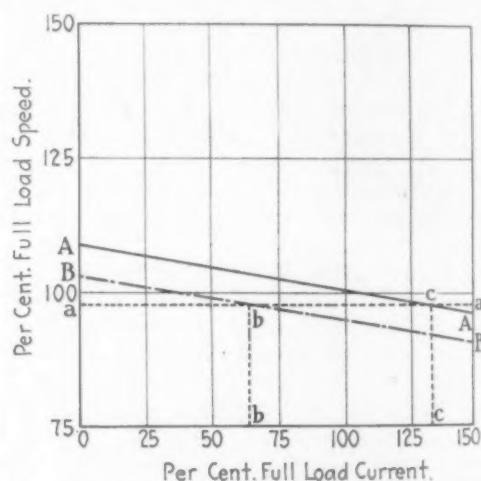


Fig. 2—Speed-Current Curves of Two Similar Shunt Motors

built commercially to be duplicates—will vary by several per cent. Take the case of any standard motor; undoubtedly all such motors built from the same drawings and patterns will have the same general physical dimensions. In each case the voltage may be the same, the armature and the field coils may be the same, but the total flux may vary considerably, because the reluctance of the iron circuit of the motor will depend on the character of iron employed and upon the lengths of the several air gaps.

In Fig. 2 AA is the speed-current curve of one shunt motor, and the dash line BB is the speed-current curve of another shunt motor which is its commercial duplicate. The only difference between these two curves is that at any given load the speed of one motor is 5 per cent in excess of that of the other. If two such motors are so connected that they must rotate at the same speed, there will necessarily be a heavy unbalancing of the total current. Thus, if the load is such that the speed of the two motors will be indicated by the line aa it will be seen that one motor will take 65 per cent of the full load current and the other motor 135 per cent of the full load current. The motors are together taking twice the full load current of one motor, but one motor

*From a paper read before the Association of Iron and Steel Electrical Engineers at Philadelphia, Nov. 4, 1916.

†General manager and chief engineer, Electric Controller & Mfg. Company, Cleveland.

is underloaded and the other motor so overloaded that it will burn out if the load is maintained.

Figs. 3 and 4 indicate similar conditions for compound motors and series motors, respectively. It will be noted that the unbalancing of mechanically connected series motors will be less than the unbalancing of either shunt or compound motors. The unbalancing of compound and series motors is least at high speed and low current and greatest at low speed and high current.

So far we have not considered the question of control, but have merely reached the conclusion that, due to imperfections in motor manufacture, two or more mechanically connected motors are apt to divide the load unequally, and that this difficulty is least serious with series motors, more serious with compound motors, and most serious with shunt motors. There are many other reasons why two or more mechanically connected motors—nominally duplicates—will make an unequal division of the total motor current.

THE CONTROL OF MOTORS IN PARALLEL

Two series motors are sometimes controlled by a single, standard, one-motor controller by connecting

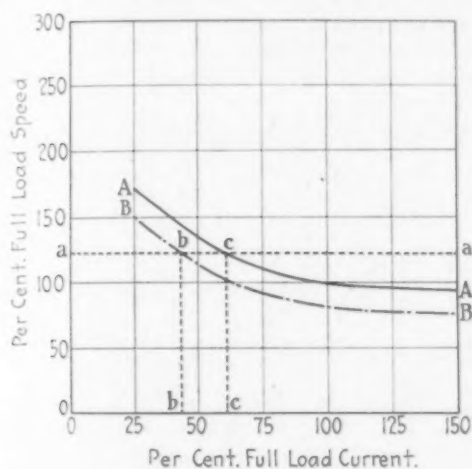


Fig. 3—Speed-Current Curves of Two Similar Compound Motors

the two series fields permanently in parallel and the two armatures permanently in parallel. As shown in Fig. 5 the series fields are represented by SF_1 and SF_2 respectively, and the armatures by A_1 and A_2 . F_1 and F_2 are one pair and R_1 and R_2 the other pair of reversing contactors. S_1 , S_2 and S_3 are the acceleration contactors which are used for short-circuiting the resistor. The entire motor current flows through the two series fields, which are of relatively low resistance, in parallel. As the current will divide inversely as the resistance of the two fields, it is difficult to balance these two circuits so that they shall divide the current equally, not only when the motors are cold but also when they are hot. The general result is that more current flows through the series field of one motor than through the series field of the other. The motor having the smaller portion of current through its series field will have less total flux to be cut by the armature conductors. It will therefore develop less counter-electromotive force than the other motor, and will permit a considerably higher current to pass through its armature. The motors will, therefore, be unbalanced, not only because of imperfections in manufacture, as shown in Fig. 4, but, in addition and more seriously, because the total flux of one motor will be larger than that of the other. Therefore, the operation of two mechanically connected series motors by one controller may lead to serious unbalancing of the current.

The first departure from this scheme of control is to employ one starting resistor, but to have individual reversing switches for each motor, as shown in Fig. 6. The designations are the same as in Fig. 5, with the exception that F_1 , F_2 , R_1 and R_2 represent an additional set of reversing contactors. With individual reversers for each motor, it is possible to connect the series field of the motors directly to their respective armatures.

This connection eliminates the unbalancing due to unequal division of current through the series field, as explained in connection with Fig. 5. It is a satisfactory connection for two mechanically connected series mo-

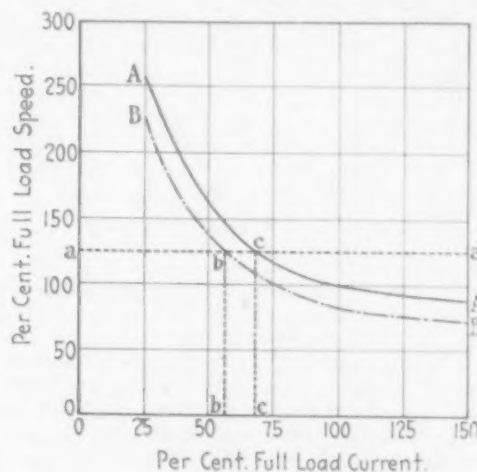


Fig. 4—Speed-Current Curves of Two Similar Series Motors

tors when these motors are merely started from rest and accelerated to receive full line voltage. The only unbalancing of load is that due to variations in the speed-current characteristics of the two motors. These connections are not satisfactory for rapid reversing or "plugging," the difficulty being one of circulating currents at the moment of reversing.

Fig. 7 indicates two mechanically connected motors operated by this scheme of control and receiving full line voltage. The direction of the current through the series field and armature of each motor is indicated by solid arrows and that of the counter-electromotive force developed in each armature by the dotted arrows. If these motors are running at full speed and the controller is reversed, the connections in Fig. 8 are immediately established. The direction of current through the series field, the direction of rotation of the armatures and the direction of the counter-electromotive force remain the same; but the connections between the armature and the series field of each motor have been reversed so that now the direction of the current through the series field and the direction of the counter-electromotive force of each motor are the same. The series fields and the armatures are connected in a closed path, whose resistance is relatively low. If the starting resistor is designed to allow the passage of 50 per cent overload at reversal, the counter-electromotive force developed in each armature is somewhat in excess of line voltage. Each armature then acts as a booster assisting the line voltage to force current through its series field. The counter-electromotive force of one motor, say the upper one in Fig. 8, will probably be, at least, slightly greater than that of the other, and more current will pass through the series field of the upper motor than through that of the lower one. The effect of this will be to further increase the counter-electromotive force of one and decrease that of the other. The fields become still further unbalanced, and presently, due to the predominance of the upper motor, a local current circulates through the series fields and armatures of both, reversing the series field of the lower motor. The direction of the counter-electromotive force of the lower motor is then reversed, and we have two series generators in series with each other, generating current in the same direction with no external resistance in the circuit. The result is an amount of current which is not only inconvenient but positively dangerous. Therefore, where only one acceleration resistor is used, it is advantageous to identify each series field with its armature in starting from rest, but on rapid reversal these connections are dangerous, and should not be employed.

These circulating currents are prevented by the connections shown in Fig. 9, an individual acceleration resistor for each motor being provided. The local path through which the circulating currents flowed has now

been made to include such high total resistance that the circulating currents cannot get started and, with these connections, rapid reversal is smooth and normal.

Fig. 9 represents, in the writer's judgment, the only satisfactory way to control two or more mechanically connected motors permanently in parallel. There is in reality a controller for each motor. In order that the controllers should function simultaneously, two-pole contactors for two motors, three-pole contactors for three motors, etc., should be used. This assures that all important circuit changes, such as reversal or short-circuiting portions of the acceleration resistors, will occur at the same time in each motor circuit.

EFFECT OF FAULTY BRAKING

Fig. 10 represents an interesting example of unbalancing, not of current, but of braking effort in the hoist of a ladle crane. Motors Nos. 1 and 2 are permanently in parallel and geared to the hoisting drums Nos. 1 and 2. Each motor was equipped with a magnetic brake, but, due probably to unequal adjustment, one brake would act more quickly than the other after the cessation of current through its coil. If the ladle is being hoisted, the motors and drums

large motors then with small. One reason is to flatten out the acceleration curve so that the current peaks will not be so large. A current peak of 175 per cent on a 500-hp. motor might cause serious line disturbance, whereas a similar overload of a 25-hp. motor would be negligible as far as line disturbance is concerned. Another consideration is that a small motor generally commutates high current peaks better than a large motor.

Perhaps the leading reason for increasing the number of acceleration contactors on larger motors is to get a characteristic which we may call controllability. It is usually satisfactory if a small motor accelerates from rest to full speed almost before the operator is aware of it, but in the case of large motors, operating heavy and important machines, the operator must have more sensitive and responsive control. Bearing these three ideas in mind, the number of acceleration contactors can be determined somewhat in the following manner: If the motion is merely one of rapid reversal, and line disturbances need not be considered, select the number of acceleration contactors from the standpoint of the size of one motor; if the question of line disturbance or controllability is important select the number of

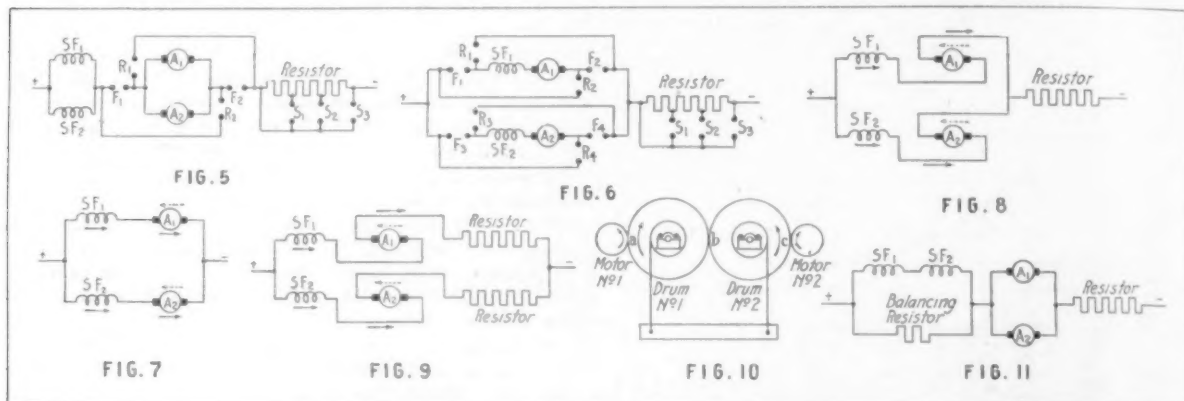


Fig. 5—Control arrangement of two series motors by single controller. Fig. 6—Control arrangement of two series motors with single starting resistor and separate reversing contactors. Fig. 7—A dangerous arrangement of series motors. Fig. 8—Another dangerous arrangement. Fig. 9—An approved method of controlling two reversing series motors. Fig. 10—Arrangement of two mechanically connected motors on ladle crane. Fig. 11—Method of controlling two motors with one set of reversers and one acceleration resistor

would rotate as indicated by the arrows. On bringing the controllers to the "off" position the brake on motor No. 2 locks the armature of that motor before the brake on motor No. 1 locks that armature. In this case the point *c* must remain stationary, but motor No. 1 exerts a force upward on the drum No. 1 at *a*. This produces a downward thrust at *b* on the drum No. 2, but as the mechanism is rigid in this direction, drum No. 2 does not move. The result is that drum No. 1 tends to rotate upward about *b*. The bearing caps, while of liberal proportions, were probably not designed to take an upward thrust, since it would appear that the weight of the ladle would always keep the drums resting heavily on their bearings. The final result was that the bolts holding down the bearing caps of drum No. 1 were stretched or broken. In this particular mechanism, if one brake locks before the other, there is always a tendency to lift one of the drums, no matter which brake locks first, and no matter whether the load is being hoisted or lowered. This is an actual difficulty which has occurred in several instances, and has led to the use of larger cap bolts.

NUMBER OF ACCELERATION CONTACTORS

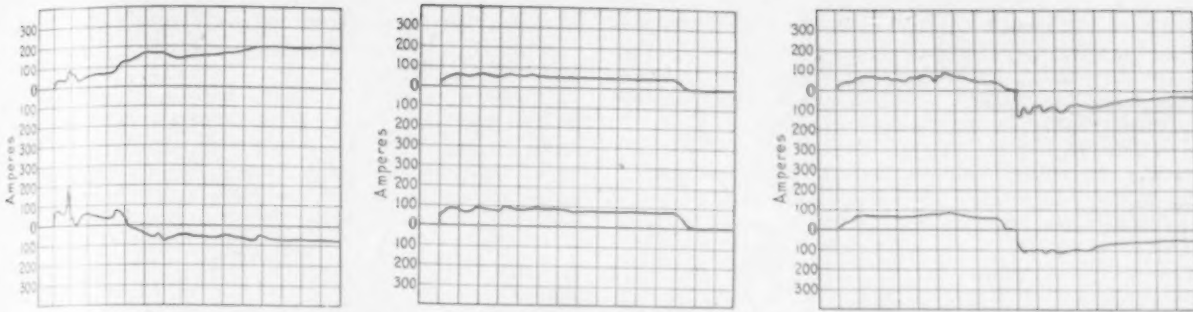
Generally speaking and within reasonable limits, the larger the motor, the greater will be the number of acceleration contactors employed in the controller. For instance, in rapid reversing controllers, it is common practice to employ three acceleration contactors for a 50-hp. and four for a 100-hp. motor. With two mechanically connected motors permanently in parallel, the question arises whether the number of acceleration contactors should be determined by the horsepower of the individual motors or by the total horsepower. Probably the best way to answer this question is first to decide why we use more acceleration contactors with

acceleration contactors from the standpoint of the total horsepower.

CONTROLLER FEATURES

Fig. 11 represents a scheme for controlling two motors with one set of reversers and one acceleration resistor. The two fields are in series with each other and in parallel with a balancing resistor. This connection assures the same current in each of the series fields, but there is no assurance that the correct amount of current will flow through the series fields. In installing a controller of this kind, cast grid resistors are generally used for the balancing resistor, having a cold ohmic resistance equal to the cold ohmic resistance of the two fields in series. During operation the balancing resistor and the fields both become heated, but the change in resistance will probably be unequal. Consequently the series fields receive considerably more or less than half of the total motor current, leading respectively to overheating or diminished torque.

When it is necessary to insure uninterrupted operation of a machine driven by several motors some engineers have preferred an entirely separate controller for each motor rather than the two-pole or three-pole controller advocated above. They have argued that in the event of an overload, both motors would be stopped with the double-pole method of control, but with separate controllers, only one motor would be stopped. As a modern controller can be reset in one or two seconds after operation of the overload device, this is not a serious objection. Another argument has been that if a control circuit or an operating magnet failed on a double-pole controller, then the entire controller was temporarily useless, whereas with the same accident with two entirely separate controllers, the undamaged controller could be maintained in operation. While this



Figs. 12, 13 and 14—Speed Current Curves of Two 25-Hp. Series Motors on Bridge Motion of Crane, Showing Respectively, Original Condition, Series Field Currents and Corrected Condition

contention has some merit, there are just twice as many coils and control circuits on the two separate controllers as there are on the one double-pole controller.

With two separate controllers there is no certainty that the important circuit changes will occur in each motor circuit at precisely the same time. There is danger, therefore, of unbalancing and of circulating currents, although it is true that these will exist for only a brief period of time. They constitute a menace, however, which should weigh heavier as a possible cause of motor trouble than the two above mentioned arguments in favor of the use of an individual controller for each motor.

THE CONTROL OF MOTORS IN SERIES

We may now consider motors permanently in series. Two motors permanently in series require only the

able period of time. In several mill tables series connections were substituted for parallel connections. This stopped racing of the motors and made reversal easier. It was found, however, that the table was slowed down somewhat, that is, it did not have as large a capacity to move steel. Of course, with motors permanently in series there is no danger of circulating currents or unbalanced load. The mechanical connection precludes the possibility of one motor reaching high speed while the other motor slows down. Therefore, from an electrical standpoint, permanent series connections must be regarded as satisfactory.

The capacity of the controller for motors permanently in series can be decided from the standpoint of the size of one of the motors. However, the heating of the reversing contactors and the line contactor is due more to the arcing at the contacts than to the

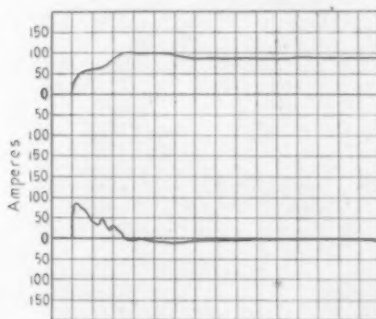


Fig. 15—Speed Current Curves of Two 20-Hp., 230-Volt Field Series Motors

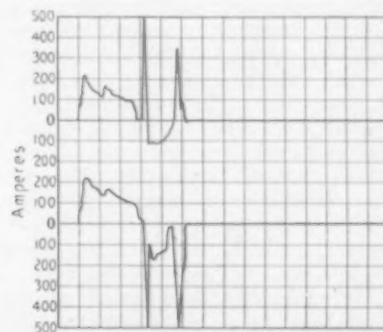


Fig. 16—Speed Current Curves of Two 25-Hp. Series Motors Controlled by Arrangement Shown in Fig. 6

amount of current normally demanded by one motor of the same size. Each motor exerts full torque up to half speed, but at any greater speed the performance of two motors permanently in series is entirely different from that of two motors permanently in parallel. The motors in series will have a diminishing torque, whereas those in parallel can maintain full torque up to full speed. This has sometimes been considered an advantage for roller table service, the important consideration being reversing and acceleration up to perhaps half speed, and that was thought a positive advantage if the motors did not have so much disposition to race if allowed to run in one direction for a consider-

passage of current when the contactors are closed. The inductive quality of the circuits to be interrupted largely decides the severity of the arc at the point of interruption. In the case of a series motor, this inductive effect is represented mostly by the series field, and with two series fields in series, there results a much hotter arc than with only one series field. Therefore, it is erroneous to determine the size of arcing contactors for motors permanently in series, from the horsepower rating of only one motor.

Another consideration is the amount of resistors that must be supplied. If two motors in series reach full speed and are then suddenly reversed, there is

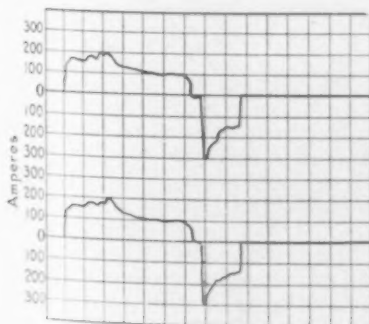


Fig. 17—Motors of Fig. 16 Controlled by Arrangement Shown in Fig. 5

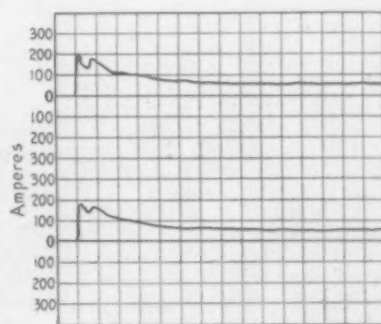


Fig. 18—Speed-Current Curves of Two 30-Hp. Series Motors Controlled as in Fig. 9

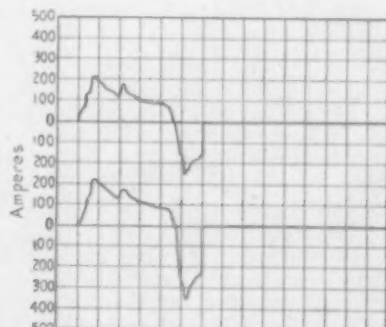


Fig. 19—Speed-Current Curves of Two 50-Hp. Series Motors Controlled as in Fig. 9

a voltage at the moment of reversal, equal to the sum of the line voltage, and the counter-electromotive forces of the two motors. Roughly speaking, this is about three times line voltage, which demands more resistors for reversal than in the case of one motor.

It has been held by some that it is easier to accelerate two motors than one motor of equivalent rating. The writer has made a thorough investigation of mill type motors to determine in a variety of cases, the time required to accelerate the armature from standstill to rated full load speed, supplying the motor with the usual acceleration current, but he cannot find any support of the theory that a small motor can be accelerated to full load speed more rapidly than a large motor, assuming in each case the usual acceleration current and taking account of the fact that the normal speed of large motors is less than that of small motors.

CURRENT CHARACTERISTICS

Figs 12 to 19 are current curves of two mechanically connected motors permanently in parallel, which show graphically the simultaneous variations of current in two entirely separate circuits. They are believed to be the first curves of this kind ever made. Each figure shows the current changes in the two motors, which for brevity will be known as the top and bottom motors, meaning thereby, the motors whose curves are shown respectively at the top and bottom of the illustrations.

Fig. 12 represents two 25-hp., 230-volt, series motors operating the bridge motion of a crane having a 116-ft. span. The controller is identical with that shown in Fig. 5. To our surprise, we found that the current in the top motor rose to 200 amp., whereas the current in the bottom motor actually reversed and reached a value of 80 amp. The bottom motor, therefore, was acting as a generator and retarded the crane to the extent of 20 hp. One motor alone would drive this crane faster than the two in parallel. It was surmised that this condition was due to unequal currents flowing through the series fields and the instrument was connected to measure the currents in them, the resulting curves being shown in Fig. 12.

To correct the unbalanced condition, additional resistance was placed in series with the field taking the largest current, making the division of current as nearly equal as possible. Fig. 14 shows the motor currents after the fields had been equalized. One motor takes about 60 amp. running current and the other about 40 amp., but by comparison with the conditions shown in Fig. 12, the installation could be regarded as fairly satisfactory. The current, at least, flows in the same direction in each motor.

Fig. 15 relates to two 20-hp., 230-volt, series motors driving another machine. The controller was the same type that was used in the previous test. When acceleration was completed, the top motor took 90 amp., whereas about 5 amp. passed through the bottom motor in the reverse direction. The point which is emphasized is that these two motors would have had a liberal surplus of capacity had they been controlled in a correct manner. They were originally made larger than seemed strictly necessary in order to provide just this capacity for emergency, but due to the poor method of control, one of the motors was made to take so much current that there was no safety margin left.

Fig. 16 relates to two 25-hp. series motors regulated by a controller of the type shown in Fig. 6. It has been pointed out that this type of control is satisfactory for acceleration from standstill, but at the moment of reversal heavy circulating currents come into existence. Fig. 16 is a striking confirmation of this theory. The acceleration is satisfactory, but at reversal, the bottom motor reverses the polarity of the top motor and a circulating current of at least 500 amp. flows through the two motors in series.

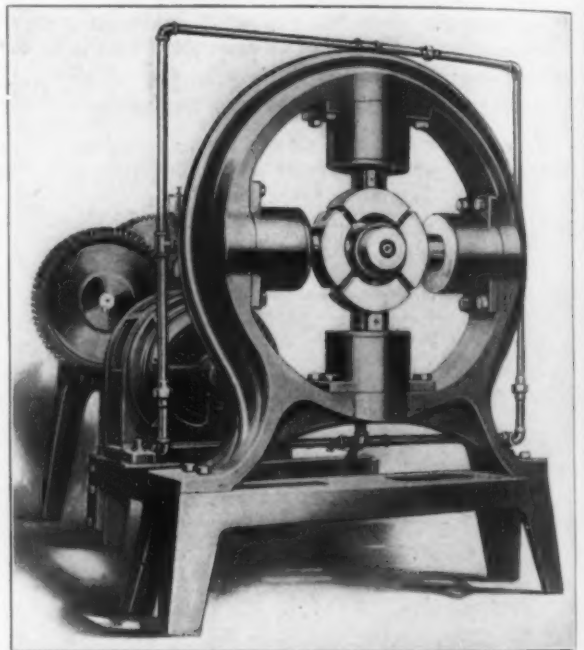
An attempt was made to correct this difficulty by connecting an equalizer from the junction of the series field and armature of the top motor to the junction of the series field and armature of the bottom motor. This was merely a reversion to the type of controller shown in Fig. 5, with the fields permanently in parallel and the armatures permanently in parallel. The danger

of circulating currents on reversal, was removed, but the division of load was not good, the results being indicated in Fig. 17.

Figs. 18 and 19 show the operation of what the writer considers the correct method of control. The connections are those of Fig. 9. The controller is made up of two-pole contactors throughout, one pole of each contactor being in one motor circuit and the other pole being in the other motor circuit. Fig. 18 shows the acceleration and reversal of two 50-hp. series motors. There is little comment to be made on these curves except to say that they are all right. The currents during acceleration, reversal, and during normal running are almost the same in each circuit; each motor is doing its fair share of the work, and the only uneven division of load is due to imperfections in the motors themselves.

A Universal Flue Welding Machine

The Southwark Foundry & Machine Company, Philadelphia, Pa., has developed a universal machine for welding flues up to 5½ in. in diameter that is designed to meet the conditions which have arisen since the gen-

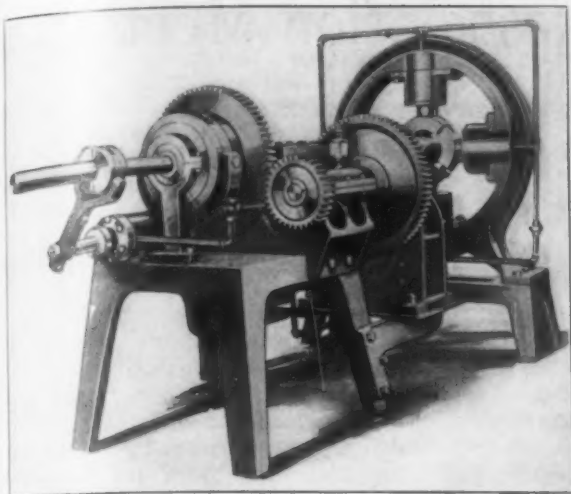


The Air-Actuated Mechanism for Clamping the Flues to be Welded Consists of Four Cylinders Connected to a Single Air Line and Operated Simultaneously by a Foot Valve

eral adoption of superheaters for use on locomotives. With this machine, it is emphasized, it is possible to take safe ends of greater length than has been the custom in the past which has introduced the complication of making it necessary to support the end while it is being heated and avoid any unusual movement in the transmission from the heating furnace to the welding operation. This has been overcome by locating the furnace in front of the welding mandrel with resultant savings in time and heat in transferring the flue to the welding machine. Another feature of the machine is the working of the weld on the inside instead of on the outside of the tube.

The machine consists of two main parts, apart from the furnace, the clamping head at the front and the driving mechanism at the back. The former is a single circular casting with four air cylinders mounted on the inside. Metal snap rings are provided for the piston instead of leathers of the ordinary cup type, and the front end of the rods are provided with sectional dies that are clamped to the outside of the flue at the line of the weld. As all four cylinders are connected to a single compressed air line carrying a pressure of from 80 to 100 lb., they operate simultaneously when the valve is opened.

Extending longitudinally through the center of the head is the welding mandrel fitting the inside of the



The Locomotive Flues Which Can Be as Large as 5½ in. in Diameter Are Supported during the Welding Operation by the Inserted Mandrel Shown at the Left That Begins to Rotate as Soon as the Flue Is Clamped in the Head at the Right

flue. This mandrel is hollow and has four rollers assembled in its body which can be moved radially by inserting a taper mandrel that reaches through the middle of the welding mandrel from the back of the machine. This taper mandrel is operated by an air cylinder which is controlled by the main foot valve that actuates the clamping system. The main mandrel is driven at a speed of 100 r.p.m. through two gear reductions by a 1½-hp. motor mounted on the framework underneath the gearing as shown. The gears employed are of the cut type.

An adjustable platform in front of the welding head supports the welding furnace and gives the proper location for safe ends of different lengths. The welding head is protected from the heat of the furnace by a cast-iron tank or water back. The mandrel back of the welding rollers approximates the inside diameter of the flue that is being worked on and supports the weight of the safe end while the latter is being heated and moved to the welding position.

When the machine is in use the operator stands at some distance from the furnace and uses a foot valve which controls the entire operation of the machine. The piping is arranged so that the clamping heads close in on the outside diameter of the flue before the taper mandrel expands the rollers to make the weld. The mandrel is started by an air chuck operating automatically with the clamping of the flue. Some type of

roller table is ordinarily placed in front of the machine to support the flue. With this equipment one crew can turn out 120 superheater flues in a 10-hr. day.

Inclosed Headstock Roll Turning Lathe

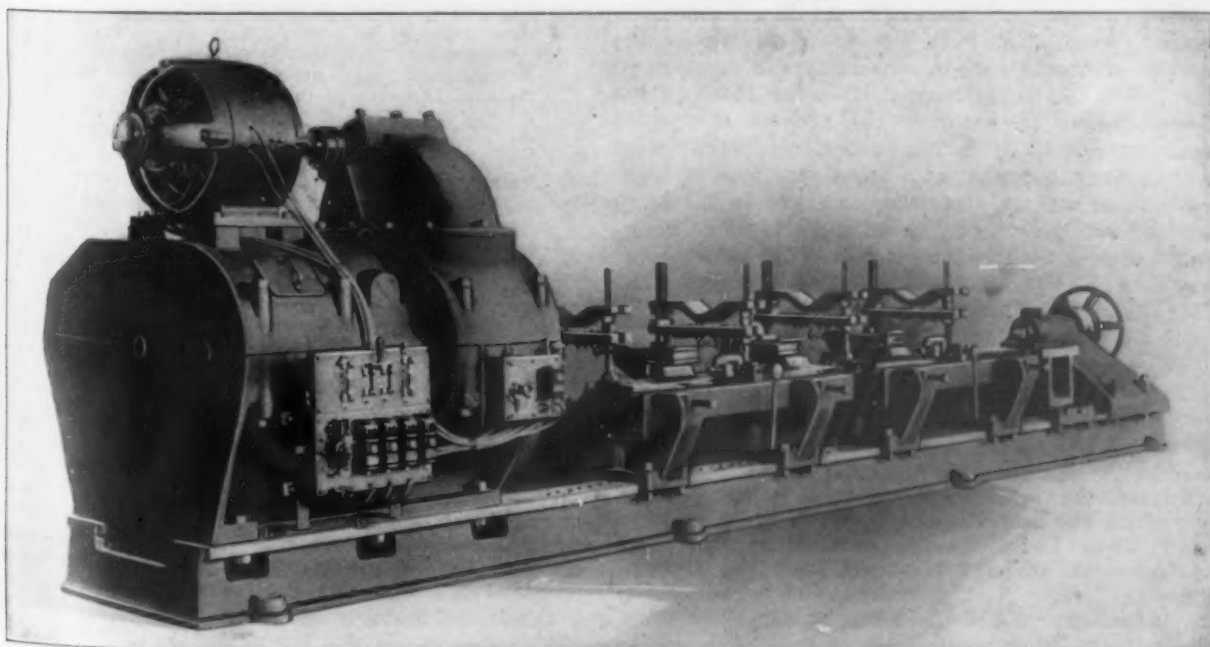
The Youngstown Foundry & Machine Company, Youngstown, Ohio, builder of sand and chilled rolls, ingot cars, shearing machines, roll lathes and spike machines, has lately placed on the market an inclosed type of roll turning lathe. It embodies some new features, such as the use of a closed box section for the bed, push button control for the motor and numerous holes in the gear guards for inspection purposes.

The headstock is of the inclosed type, all gears being thus covered in a more sightly manner than in the open-type machine where separate gear guards must be constructed. All gearing, including the internal gear of the face plate, is of steel with cut teeth, and may be run in a bath of oil if desired. All bearings have solid brass bushings, held in place by removable caps. If it is not desired to run in a bath of oil, all bearings may be lubricated from the outside, through pipes arranged for that purpose. Large handholes make inspection of the gearing easy, without the removal of headstock cap, which acts as a support for motor drive. The headstock cap and motor may be removed as one unit, exposing all gearing, in the event of repairs being necessary. The headstock cap itself does not hold the shaft bearings in place, all of these being separate.

The main spindle of the lathe on which face plate turns is a hollow forging, facilitating the easy removal of the center, in the event of breakage. Massive general construction is used throughout, the bed plate being a closed box section, which is relied upon to eliminate chatter and give the rigidity essential in this class of machine.

The lathes, which are built in five sizes ranging from 18 to 42 in. in swing, are operated by adjustable-speed motors, directly connected through Francke flexible couplings. Speed ratios of either 4 to 1, or 8 to 1, may be furnished. The lathe illustrated is equipped with push button electric control, mounted directly on machine, and is one of three machines recently shipped by the builder to the Crescent works of the Crucible Steel Company of America at Pittsburgh.

Shipment to Norway from the United States of 3000 tons of copper has again been arranged by the Norwegian and British governments, provided an equivalent amount of Norwegian copper pyrites is shipped.



In This Motor-Driven Roll Turning Lathe the Gears in the Headstock Are Entirely Inclosed, but Handholes in the Covers Are Provided for Inspection Purposes

National Founders' Association Meeting

Featured by the Inauguration of the National Industrial Conference Board and of a Service Bureau on Approved Foundry Methods

The big promising movement centered in the National Industrial Conference Board, to educate employer, employee, the public and the legislator, and, by enlisting the active support of nationally respected industrial leaders, to influence legislation believed to be for the greatest good for the greatest number, at least industrially, was the outstanding contribution to industrial progress offered by last week's annual meeting of the National Founders' Association. Besides this, the meeting was the occasion for announcing the establishment of a committee on foundry methods, this having an aim no less ambitious than to "investigate the appliances which will improve foundry practice." The meeting was the largest yet held by the association.

The first session of the meeting, which was held, as usual, at the Hotel Astor, New York, occupied Wednesday forenoon, Nov. 15. The address of the president, William H. Barr, dealing in part with statistics showing an increased cost with the shortened work day, was reviewed in last week's issue. The reports of Commissioner McClintock and Secretary Taylor are given below. An address on "Industrial Legislation" was made by George F. Monaghan, general counsel of the association; the year's work of the committee on safety and sanitation was told by A. F. Corbin, chairman, and the announcement of the new service to members, and, indeed, to the foundry industry, inaugurated through the organization of the committee on foundry methods, was described by the chairman of the committee, Joseph J. Wilson, Cadillac Motor Car Company.

The first formal announcement of the existence of the National Industrial Conference Board was made at the Wednesday afternoon session. The present composition of the board and the purposes were detailed at length in last week's issue, on the basis of a long statement made by Magnus W. Alexander, manager of the board, but Mr. Alexander's actual presentation before the meeting was in the nature of the tale of an observer of a meeting of the board five years hence. Thus he added to the formal paper by drawing the picture of specific achievements likely in the succeeding several years and by suggesting his own belief that men of highest caliber will be vigorously engaged in the work throughout that time. At the Wednesday afternoon session also addresses, reviewed below, were made by E. W. Rice, Jr., president General Electric Company; Frank A. Vanderlip, president Na-

tional City Bank, New York; and Ely Griswold, Griswold Mfg. Company, Erie, Pa.

The annual banquet, held Wednesday evening, continued the serious strain expected, of course, in the day sessions, and Frederick P. Fish, of Fish, Richardson, Herrick & Neave, bankers, Boston, and chairman of the National Industrial Conference Board, and James A. Emery, counsel National Association of Manufacturers, were the speakers. President Barr presided as toastmaster.

The concluding session, held on the morning of Nov. 16, was devoted in part to the Pittsburgh and Bridgeport strike situations. Edward Kneeland, United Engineering & Foundry Company, Pittsburgh, discussed the former, contributing some astonishing figures of output realized with workmen only a short time in a foundry. Edward K. Nicholson, counsel, Bridgeport Manufacturers' Association, Bridgeport, Conn., explained how damage suits in Bridgeport were promising to give relief from union delegate domination. W. H. Van Dervoort, president of the National Metal Trades Association, addressed the meeting briefly on the work of the joint conference board on apprentices.

RESOLUTION ON ADAMSON LAW

The association took cognizance of the attitude of the railroads toward the Adamson law, and passed the following resolution backing the railroads in their fight:

Whereas, a serious question of grave national importance has arisen relative to the conflict between the Constitution of the United States and the so-called Adamson law, which law seeks to compel railway systems of the country to raise the wages of certain of their employees under the pretense of compelling an eight-hour work day, and

Whereas, the railway systems of the country have indicated their opposition to the enactment and operation of that law, claiming said law to be in violation of rights guaranteed all citizens by the Constitution of the United States, and

Whereas, further, the Constitution of the United States guarantees to every citizen the right to test through the courts of the land any act designed to deprive him of life or liberty or property without due process of law, now, therefore, be it

Resolved, that we, the National Founders' Association manufacturers and shippers of products in the various States of the United States, declare that this right to have their cause determined by judicial proceedings should be secured to the railway systems of the country and that this association approve of their attitude in the maintenance of that right.

Achievements of the Industrial Conference Board Forecasted

Mr. Alexander, who was introduced as the temporary manager of the National Industrial Conference Board, abandoned the formal statement which he had prepared and which was printed practically in full in last week's issue; instead he had the courage to engage in prophecy and asked his audience to project itself into a period five years hence. He then undertook to relate some of the happenings of a meeting of the conference board on the third Thursday of May, 1921. He located the board in a commodious office in one of New York's skyscrapers. The meeting had already been in session for

five hours, save for a short time for luncheon, and not had fifty-five in all participating, seated around a U-shaped table. Of these forty-eight represented in pairs twenty-four national employers' associations and in addition there was a prominent banker and two manufacturers, one from the South and one from the West, members of the board's advisory council, and also the chairman and manager and secretary of the board. As observer, he noted the big minds identified with the advisory council, men who regarded the work not only as a pleasure and duty, but a privilege to render the

national service. The association of bankers had become identified with the movement, he discovered, though at first that Association was loath to recognize the industrial movement.

Mr. Alexander had himself admitted to the board room at a time when the secretary was reading a communication from the White House, asking for suggestions for membership in the Federal Trade Commission. A card index of qualified people for Federal and State governmental commissions, it appears, had been compiled, and it was an easy matter to pick out twelve names which the board proceeded to submit in the order of preference. Whereas, he said, it might earlier have seemed questionable to approach the board on such a subject, there was now no suspicion aroused in the method of appointment, largely because of the unapproachable character and non-political bias of the advisers. Even at this early period cabinet officers had availed themselves of the information in possession of the board. No single case of a bad selection or misplaced confidence had resulted and business men were now receiving co-operation and not hostility as before.

As observer of this imaginary meeting he discovered that the board had the support of a noted constitutional lawyer as a representative to argue before the Senate judiciary committee against a bill which was not approved and his effort was supplemented by the chairman of the board's advisory economic committee, who had presented a clear picture of the harmful consequences of the proposed bill. The result, it appeared, had been that the bill was refused sanction and a joint committee had been appointed by the Houses of Congress to study and report at the next session. The board was thus stimulated by the fact that a bill of unsound character had been prevented of passage in part by the unbiased, competent criticism of the board's economic and legal committees.

Through such study of economic and legal matters, it appears that sound laws had been enacted three years previously in relation to social insurance in the United States, and it had come to be an axiom that society should assume the direct supervision over the morals, health and safety of the people. It appeared that the managing director of the advisory board, after studying the subject and issuing a monograph to the members, had brought about a unanimity of opinion based on the experience in this and in foreign countries. After the board had expressed itself, other associations were led into similar channels of economic thought and in turn various state associations, so that there seemed to be no reason for surprise that a bill should be passed so well fortified with arguments simmering down from the board and through the various national and state associations.

Mr. Alexander then discovered that the board took up the question of the progress of the last few years in the industrially growing states of the South and the Middle West in respect to boy and girl labor. An appropriation of \$50,000 additional was made to the trades training committee for the training of teachers and the stimulation of manufacturers to do their duty by their country and industry. Some of the committees, it was noted, made a practice of bringing in outsiders to assist in the work of the board and zeal and earnestness were conspicuous.

Mr. Alexander found the board at this time publishing a weekly journal, the "Industrial Economist," which at this meeting, it was directed, should have an addition of pages to cover a digest of congressional and state legislature bills. The paper was now sold at newsstands and means were taken to send it free of charge to stockholders of companies so that owners of factories could get an idea of the necessities and requirements of industry. The influence of the paper, he felt, was shown in a tendency to interest a better type of men to enter legislative halls and a tendency to propose bills less absurdly hostile than heretofore.

The observer imagined some brief discussions at the meeting. One board member described his discovery of the craving by some employees for his personal interest. While his efforts were first scoffed at, they resulted in improved working conditions and increased efficiency and now he could talk frankly with employees who were loyal because they believed in the honesty and good

judgment of the employer. It was also brought out at the supposititious meeting that large corporations had sent emissaries into foreign countries but the corporations of other countries had the co-operation of their governments in that these emissaries had been given a statutory recognition, and accordingly the board was asked to consider what could be done in this connection with the representatives of American business houses.

The After-the-War Struggle

Following Mr. Alexander's presentation, an address was made by E. W. Rice, Jr., president General Electric Company, on "How Shall Manufacturers Contribute to American Industrial Progress?" What he said was in part as follows:

"There are many indications that when the great war ends our troubles in this country will begin. We have received ample notice that the principal actors in the present struggle will then begin what has been termed an industrial war. This industrial war will not permit us to remain neutral, because it will be aimed to a large extent at us and we will become involved, whether we like it or not. It is evident, therefore, that we as a people, and especially those directly interested in our manufacturing industries, will be faced with new, complex and even menacing conditions.

"It is certain that the great industries of England have not only remained intact up to the present, but have been enormously enlarged and improved. England bitterly regrets her attitude of indifference towards science and the industries, and is now headed in the right direction. She is certain to be a more powerful and efficient competitor in the world's industrial markets than before the war. She is, moreover, copying as rapidly as possible whatever seems to be good in the German industrial system.

"German industries also are not only unimpaired, but are even improved and increased, and after the war, under the well-known system of governmental protection and assistance, will be in a position to compete more efficiently than ever for the world's markets.

ENERVATED BY PROSPERITY

"The men and women of industrial Europe, as a result of the war, are being trained in habits of discipline, economy and self-sacrifice, while we are being enervated by our great prosperity. The peoples of Europe are being taught by a life-and-death struggle the imperative necessity of co-operation in every detail of life. Their armies are now fighting, but after the war, even if they still continue the struggle commercially and industrially, the now contending groups will in effect be united to compete with us, not only in neutral markets, but if possible in our own market.

"It will not require a very exhaustive process of self-analysis to disclose that we are all relatively deficient in discipline and co-operation compared with the conditions which will exist in industrial Europe after the war.

DAY OF EXTREME INDIVIDUALISM IS PAST

"The day of extreme individualism is past. The problems pressing for solution are so great that no single manufacturer, no matter how powerful, or group of manufacturers, no matter how numerous, is able to stand alone to the exclusion of other manufacturers or groups of manufacturers. The time has come when co-operation in the broadest sense is essential to the maintenance of our industrial prosperity.

"There is to-day a serious lack of mutual understanding between the manufacturer and the wage-earner, and while considerable progress has been made in bringing about more harmonious relations, the situation leaves much to be desired. This lack of understanding and confidence is largely due to a lack of knowledge of each other, and this knowledge is lacking in the manufacturer as well as in the wage-earner. Employers are desirous to maintain good, healthful conditions of work and to provide fair treatment for their employees and to pay liberal but just wages, but the employer still needs to take an increased personal interest in his men as men.

GOVERNMENT HELP, BUT NO PATERNALISM

"The manufacturers of other countries will have the great advantage of the intelligent and sympathetic help of their Governments and of their people, and patriotism will be lifted to the highest plane. Our manufacturers, if we are to be successful in the coming struggle, must secure similar intelligent and sympathetic treatment from our Government and our people. We as manufacturers naturally think that we are entitled to such treatment and, in any event, we are making and shall continue to make an earnest endeavor to deserve it; furthermore, we intend to make continuous and, we hope, intelligent efforts to remove such defects in our business methods as may exist. In this process we will take the public and our employees into our confidence and deal with both in a spirit of absolute frankness and sincerity. We will endeavor to obtain constructive and helpful assistance from all sources, but we do not wish to encourage paternalism either in our relationship with our employees or on the part of our Government with us.

A WORD FOR THE INDUSTRIAL CONFERENCE BOARD

"The National Industrial Conference Board, recently brought into action as a co-operative force among manufacturers throughout the country, is the type of agency which under wise and efficient leadership will be most useful in the solution of the many vexing problems herein briefly outlined and of many more that are constantly arising with changing social, industrial and political conditions. We are fortunate in having such a body created at this time; the need is great."

ADDRESS BY FRANK A. VANDERLIP

The banker's relation to industry was discussed

briefly by Frank A. Vanderlip, president National City Bank, New York. He made a plea for more statesmanship in business, arguing that business men take too little time to think in a broad way of the things which are affecting society. The very fundamental problem of all, he held, is that of government. He told of a conversation with an eminent French financier who believes that as great changes in forms of government will result from the European war as did from the French Revolution, that democracy, in putting mediocrity in legislative places, had been a failure, and conditions are such that whenever in a legislative assembly one appears strongly representative of any one interest, he is discounted as a special pleader for that interest. He agreed that we are going to see a co-operation in the relations between government and business in European countries that is now novel in business life. Unless there is co-operation in this country, at least a sympathetic co-operation, we are going to find ourselves handicapped in the new order of things. This country is no longer isolated and what the world does will affect us.

He emphasized that we shall see most adroit tariffs in European countries and these must be met not by log-rolling tariffs, but by equally adroit measures. He intimated the possibility of our seeing ownership of utilities such as shipping. The business of transportation, he added, has felt the hand of government more than any other branch, and in many respects properly, but any business so hampered does not attract investors and about the only credit it has is its capacity to borrow. All last year less than \$13,000,000 was put into new construction and none so far this year. One of the troubles he felt is that railroad men, like those in charge of other lines of industry, are good operators, but too few of them are statesmen, looking at it in a broad way.

The Labor Troubles at Pittsburgh and Bridgeport

In introducing Mr. Kneeland to discuss the "Pittsburgh Strike Situation," President Barr emphasized that the Pittsburgh foundrymen had proved a barrier between the 8-hr. day and the foundry industry. Mr. Kneeland told some of the details of the strike which had been instituted eleven months ago against 33 foundries, with Pittsburgh selected as the point of attack in that it was the strongest center from the standpoint of the union in machinery casting work as distinguished from stove foundries. One of the difficulties was to secure accommodations for the men taken on in place of the strikers, this involving, for example, the rental of one entire hotel and the provision of automobile conveyances, particularly after a street railroad strike occurred. He reported that there were now thirty-two open shops in operation at 60 to 100 per cent of normal capacity, with at least one at better than 120 per cent of capacity.

MORE CASTINGS AT LESS COST

The most remarkable contribution to the subject made by Mr. Kneeland was, however, his figures to show that more castings were now being made and at less cost per man than before the strike and the men were not exploited either, but were getting better wages than the union paid, in spite of the fact that few of them were skilled in foundry practices. He paid a special tribute to the herculean tasks of the foundry foremen and superintendents to develop workers, and said that he could not say too much about the services of the president, commissioner and others of the National Founders' Association.

His figures for production in the case of one steel foundry, which prior to the strike had a record of 2000 tons per month as the maximum, were as follows: In September, 1915, the production was 1508 tons; in October, 2123 tons; in November, 2235 tons, while the December figure was 1097 tons, the strike having been declared about the middle of the month. The production figures after that were as follows: January, 1916, 1203 tons; February, 1508 tons; March, 1869 tons;

April, 1990 tons; May, 2036 tons; June, 1925 tons; July, 2277 tons; August, 2083 tons; September, with furnace troubles, 1591 tons; but October no less than 2542 tons, against the former maximum of 2000 tons, as stated.

EFFICACIOUS DAMAGE SUITS IN BRIDGEPORT

What Mr. Nicholson had to say on the Bridgeport case was in part as follows:

"While injunctions had been granted in very many states and on very many different occasions restraining striking employees from picketing, threats, intimidation, etc., the injunctions were rarely successful, in that it was possible for the results to be accomplished by methods which did not openly violate the injunction. After considerable conference it was suggested that suit be brought by some of the founders against individual defendants asking for damages for injury to property." Four such suits were instituted by four foundry companies, each against the local union as a voluntary association, against J. R. O'Leary, a vice-president of the International Molders Union, recognized to be in charge of the Bridgeport strikes, against T. F. Duffy, the local representative of the American Federation of Labor, and against the financial agent of the local union. All were sued individually and not as officers of unions, and also a large number of individual strikers who had participated in acts calculated to injure the business of the plaintiffs. The suits asked each for \$50,000 damages. The allegations covered a conspiracy to prevent the operation of the foundries; the threat to call a strike, the picketing, the acts of intimidation, all tending to prove the attempt to injure the founder's business.

"Under the attachment proceedings which are permitted in an action of this kind in the State of Connecticut," Mr. Nicholson explained, "there was attached the real estate of the defendants who owned real estate, the bank deposits, whether savings or national, of those defendants who had bank deposits, and in the case of Duffy, his body was attached and a bond given by a

surety company for his release pending the trial of the action. Defendants without property can be arrested and placed in the county jail, either to respond to judgment or take the oath prescribed for poor debtors, which is that they have not over \$17 exempt from attachment. O'Leary remained out of the city until after the return day, and then upon the issuance of a supplementary attachment, left the city and has remained away, thereby removing from the strike the influence of the International Molders Union as represented by him. The body of Duffy was attached and he was released under bonds. Instructions were given to the sheriff that he should make no arrest where it would act, in his opinion, as a hardship upon the individual defendant or his family."

"The theory of the action," Mr. Nicholson said, "is that the reciprocal duties between the employer and the employed, that the employee is no more permitted to injure the property or affect the liberty of the employer than is the employer permitted to affect the property or the liberty of the individual employee. Whether or not judgment will be secured in these cases rests upon time and the court, but counsel for the plaintiffs, at least, believes that the position taken is correct." The Bridgeport shops are open, Mr. Nicholson added, some of them having their full quota of employees and others having a large percentage. There is still some picketing being carried on, with its attendant conditions.

AN INTIMATION OF SLAVERY TO THE UNION

One of the strange developments of the Bridgeport situation is that on Nov. 1 a number of founders who had re-employed men who had been on strike received letters from the attorney of the local union stating that these men had signed contracts with the union to work for it for a period of one year from Sept. 21, 1916. The notice further stated that if the founders continued to employ these men the union would seek "such redress as the law will permit." This seems to be a direct attempt by the union, Mr. Nicholson held, to interfere with the liberty of the individual employee to contract. The men with whom the contracts are supposed to have been made do not recall signing them. "If trade unionism in the United States," said Mr. Nicholson in conclusion, "has come to a pass where the individual employee can be so bound by his union as to be unable to secure employment except under its direction, and can so use the subterfuge of a contract to deprive the employer, under the orders of the union, from employing men who are willing and ready to work for him, then slavery is still in existence in this country."

THE STORY OF THE NATIONAL ELECTIONS

A contribution to the labor discussion of the meeting was also made by James A. Emery, Washington, D. C., in an address at the banquet. "San Francisco," he said, "has supplied the final evidence of the proposition which the recent national elections have demonstrated, that the American electorate cannot be organized and delivered in racial, religious or class groups. The leaders of organized labor undertook," he pointed out, "to commit their followers not merely to a national ticket, but to Congressional candidates who were presumed to represent a dominant trade union interest. The returns offer a conclusive proof that the effort has been as successful in the present as it has been in the past. The national vote gives no testimony of the separable delivery of organized labor's ballots to a presidential candidate. The Congressional returns reinforce this conclusion. Special contests to which organized labor addressed itself with exceptional vigor were lost. Mr. Tavenner, author of the anti-efficiency measures; Mr. Ralston, counsel for the American Federation of Labor; Mr. Buchanan, former president of the Structural Iron Workers, and a special spokesman of the Federation on the floor, were badly defeated in various Congressional districts, while Mr. Lewis, chairman of the House Labor Committee, was defeated for United States Senator by a comparatively unknown opponent in a state carried by the President, while, if it be said that the vote of San Francisco, which decided the election in California, was brought about through the political dominance of organized labor in that city, the idea is refuted by the fact that the electorate, which carried that city for the President, gave a majority of 5000 against an anti-picketing ordinance.

A LESSON OF THE ERIE STRIKE

Ely Griswold, Griswold Mfg. Company, Erie, Pa., reviewed the experiences in connection with the Erie strike and from this pointed out how the National Founders' Association could be assisted by local associations. Such an association for each foundry center would help to eliminate sharp methods of securing business and would bring about a better general system of cost keeping. Such an association would, he urged, have means for keeping an active interest on the part of individual members, which interest is necessary no matter how efficient are the paid officials of the larger body. The advantage of the local association was shown in the case of Erie, which had five members in the National Association before the strike and now has fifteen. Local organizations of foundry foremen and pattern foremen were advised.

A Committee on Foundry Methods and Appliances

One of the important announcements of the meeting was that made by Joseph J. Wilson, chairman of the association's committee on foundry methods, telling of a plan to investigate appliances which will improve foundry practice. The committee is to report its discussions and findings to the members of the association. The committee, which held its first meeting on Aug. 4, is composed of the following: Joseph J. Wilson, Cadillac Motor Car Company, chairman; H. P. Parrock, Lumen Bearing Company, secretary; W. M. Gartshore, McClary Mfg. Company, London, Ont.; John Knickerbacker, Eddy Valve Company, Hartford, Conn.; D. W. Sowers, Sowers Mfg. Company, Buffalo; P. J. Flaherty, Johnson Bronze Company, New Castle, Pa.

The committee will constitute an advisory board and the service bureau of the association will be the means for investigation and reporting. Materials, tools, supplies and equipment; costs; melting, molding, core making and cleaning; inspection and shipping; planning and production, and patterns and flasks are to be taken up as time will permit. The committee has already issued a bulletin on the benefits to be derived from the use of molding machines and has in preparation bulletins on the selection and installation of molding machines, and on foundry costs, hand squeezers and power squeezers.

IMPROVEMENTS IN SAFETY DEVICES

The report of the committee on safety and sanitation was made by A. F. Corbin, chairman, of the Union Mfg. Company, New Britain, Conn. An improvement in safety goggles and in foundry shoes has been made in the year and a legging has been provided with a chain to fit under the arch of the shoe to prevent the legging slipping upward. The committee reported a largely increased sale of the safety appliances and in this respect alone a good sign of increasing interest. No profit of course is attempted, but the prices have been sufficient to cover the expenses of the safety inspector. Mr. Corbin paid a tribute to the work of Mr. Alexander, formerly in charge of the activities of the committee, and mentioned a small picture book of safety pictures lately issued which he advised putting in the hands of every employee.

The presentation of the report was made the occasion for the amusing episode of the convention. In this, as in some earlier like acts, the villain was Mr. Alexander and the hero President Barr. Mr. Alexander took the opportunity to say that the safety committee had recognized the increasingly important part taken by women in industry and had devised a N A S O first-aid jar made especially for women. He explained

that instead of the usual list of antidotes and first-aid instructions printed on the underside of the cover of the N A S O jar for men, the inside of the cover in this case was a mirrored surface, and it was about this moment that the audience began to appreciate the hoax, so it was quickly prepared for the demonstration that the body of the jar contained a gigantic powder puff and was filled with a goodly supply of powder. President Barr had been made to assist Mr. Alexander in removing the jar from its box, and while the latter finally tried to indicate that President Barr was the proper recipient for the jar, Mr. Barr quickly threw the burden of proof on Mr. Alexander.

WAGES AND THE HIGH COST OF LIVING

On the question of providing additional wages to compensate for the higher cost of living, a topic which was introduced just before the meeting came to a close, references were made to agreements to give a bonus for continuous employment. I. W. Frank, United Engineering & Foundry Company, told something of a contract of this kind which had been in operation for nine months. The agreement is made for six months and may be terminated on a 30 days' notice. It is intended as a reward for loyalty, and every month the amount due the individual is entered in a pass book to his credit. Julius Goslin, Joubert & Goslin Machine & Foundry Company, Birmingham, told of an agreement providing for a 10 per cent bonus, which was paid each month to those worthy and somewhat long in the employ of the company. It was not cheapened by being of general application but given to perhaps 60 per cent of the mechanics, who are of the substantial type and often owners of their own homes. None had taken the money and departed, but instead many had asked for a renewal of the contracts.

Other members told of efforts to buy on the wholesale for the benefit of individuals, such as canned goods, for example, an arrangement which could be specially well handled where a company had a store, the profits of which perhaps went into a general fund for employees. In one case coal was purchased for the men and retailed at the wholesale price.

THE OUTLOOK IN LEGISLATION

In reviewing legislation, the general counsel of the association, George F. Monaghan, said that in the past year 500 laws friendly to labor had been under consideration in the various States. In a word, he said, "Labor is deified and capital nullified." One trouble is that employers' associations have usually adopted the gumshoe method and have not always come from under cover, though they believe thoroughly in their propaganda. The employer's end of the contract, he said, is rarely put before the public.

The laws now likely to be attempted aim to establish further the minimum wage law and to secure an anti-injunction law like that of the Federal Government in all the States as well as to limit the number of employees in respect to apprentices and to provide unemployment and old age insurance, mothers' pensions and the like. He emphasized that employers should be represented in the membership of reform and other organizations taking an active interest in legislation and in which are representatives of unionized labor. If employers joined in constructive legislation, the public would gradually come to understand the issues. Then an effort could be made to repeal radical legislation now on the statute books without the contenders being kept on the defensive. Such fights should be continued whether there is a likelihood of winning at the moment or not. In this a lesson can be learned, Mr. Monaghan emphasized, from the American Federation of Labor, which has now succeeded with legislation which five years ago was laughed at. The most important point of private business, he added, is public business.

HIGHER WAGES IN OPEN-SHOP FOUNDRIES

The report of Commissioner A. E. McClintock showed that in the past year there had been no strikes where wages was the only issue. Members were quite willing to consider increases in pay. Taking advantage

of the unprecedented conditions throughout the country, he said, the molders' union has put forth most strenuous effort to stimulate enthusiasm for increase in membership, but reports indicate that this campaign of the union has fallen far short of expectations. The apathy on the part of the independent molders toward unionism, he felt, was due to the fact that work has been exceedingly plentiful and the rate of pay offered by the open shop foundries has been in excess of what the closed union shops could afford to pay. The open shops, with their freedom of union restrictions on molding machines, apprentices, handymen, and output, have offered better inducements to the skilled molders and coremakers than the union shop, with its flat minimum wage and union rules and regulations. The independent molder, therefore, could see no advantage in joining the union and contributing 40 cents per week in dues and being subjected to numerous special assessments.

This inability to induce molders to join voluntarily has stimulated the union's demand for the closed shop, thereby attempting to compel the independent molders to come into the union or obtain employment elsewhere.

STRIKES LESS COSTLY TO CONDUCT

In some instances, he continued, strikes have been called in the shops of members without taking a vote of the men employed. Representatives of the union have appeared at the shop gates and notified the men that the national union had declared the shop struck, and all were warned to stay away. A few days later, and in some instances a week later, the firm would receive a communication, signed by some union official, stating that by establishing a minimum wage rate and recognizing the union, an adjustment of the strike could be made.

Many workmen, while still refusing to join the union, but wishing to avoid the annoyance and inconvenience, would immediately obtain employment elsewhere, and thus leave the union agitators and the radical element to carry on the strike at a comparatively small expense for strike benefits. This condition of general shortage of labor has enabled the union to carry on an extensive closed shop campaign at a very much less expense than during more normal times.

THE 8-HR. ISSUE IN PITTSBURGH

Mr. McClintock then touched on the 8-hr. day question as follows: The Pittsburgh foundrymen, in resisting the 8-hr. movement at its inception last December, have prevented its spread to other localities. At the time the issue was raised at Pittsburgh, the 8-hr. demand had already been made at Philadelphia, Syracuse and Detroit, and was in contemplation at a number of other points. Had the 8-hr. day been established in the Pittsburgh district, there is no question whatever but the issue would have been raised quite generally throughout the country.

Pig iron producers have estimated that foundry production for months past has been curtailed 25 to 30 per cent due to shortage of labor and the indifference and inefficiency of those on the payroll. A conservative estimate is that there are 100,000 molders and coremakers employed in the United States and Canada exclusive of stove shops. Fully one-half of them work on a 10-hr. basis. To place them all on an 8-hr. basis would mean a reduction in working hours of fully 150,000 per day. This means that 18,750 more molders would have to be employed to do the work now being done by the 100,000. These figures are startling, but convincing. It is not necessary to explain that the men to do this work are not available.

I am firmly of the belief that there should not and will not be an 8-hr. day if the foundrymen will stand together and loyally support this association. In considering this 8-hr. agitation it is well to keep in mind that the introduction within recent years of power cranes and improved equipment has greatly reduced the lifting and hard muscular labor formerly required of a molder. This is probably true to a greater extent in the foundry than in any other industry.

SECRETARY'S REPORT

Secretary J. M. Taylor reported that in the past

year 27 firms have been admitted to membership. A few applications were received which could not be accepted. The firms elected to membership are all representative firms and a substantial gain to the organization, both through their general business standing and the number of employees. The membership of 24 concerns was terminated. Of these, 5 went out of business; 7 resigned for financial reasons; and 12 gave no reason. None of the resignations, so far as Mr. Taylor could learn, was due to dissatisfaction with the policy of the association.

The number of molders and coremakers reported by our members increased 35 per cent over last year, the average for 1916 being the largest in the history of the association.

A new departure, this year, was the preparation of the booklet "Closed Shop Unionism." This was suggested by an inquiry from one of our members, whose men were being stirred up by the union agitators, and who wished a simple statement of the closed shop problem which would not be "over their heads." The booklet is not intended to be a learned discussion of unionism, but only a sort of first lesson, to set the workman thinking and lead him to further investigation.

PRESIDENT AND VICE-PRESIDENT RE-ELECTED

Not only was William H. Barr, Lumen Bearing Company, Buffalo, re-elected as president under circumstances which indicated unanimous hearty approval of his administration, but H. J. Boggis, Taylor & Boggis Foundry Company, Cleveland, was retained, much to his surprise, in the vice-presidency, this being, it is believed, the first time a vice-president has succeeded himself. J. M. Taylor was re-elected secretary, with headquarters at 29 South LaSalle Street, Chicago, and the Chicago Savings Bank & Trust Company, Chicago, remains as treasurer.

The following district committees were elected:

DISTRICT COMMITTEES.

First District—D. K. Bartlett, Builders' Iron Foundry, Providence, chairman; F. C. Fromm, Manufacturers' Foundry Company, Waterbury, Conn., vice-chairman; W. A. Stevenson, Norwood Engineering Company, Florence, Mass.; A. E. Newton, Reed-Prentice Company, Worcester; Enoch Shenton, Wm. Highton & Sons Company, Nashua, N. H.

Second District—Edward Norris, Utica Heater Company, Utica, N. Y., chairman; D. W. Sowers, Sowers Mfg. Company, Buffalo, vice-chairman; H. P. Macdonald, Sneed & Co. Iron Works, Jersey City; James H. Caldwell, Ludlow Valve Mfg. Company, Troy; A. S. Blagden, American Malleables Company, Lancaster, N. Y.

Third District—Ely Griswold, Griswold Mfg. Company, Erie, chairman; Wm. S. Hallowell, Harrison Safety Boiler Works, Philadelphia, vice-chairman; C. S. Koch, Fort Pitt Steel Casting Company, McKeesport, Pa.; J. Turner Moore, Reading Steel Casting Company, Reading, Pa.; John E. Thropp, John E. Thropp's Sons Company, Trenton, N. J.

Fourth District—Joseph J. Wilson, Cadillac Motor Car Company, Detroit, chairman; Geo. O. Rockwood, Rockwood Mfg. Company, Indianapolis, vice-chairman; Charles F. Seelbach, Forest City Foundry & Mfg. Company, Cleveland; Samuel Blackburn, John B. Morris Foundry Company, Cincinnati; E. R. Frost, National Machinery Company, Tiffin, Ohio.

Fifth District—James F. Lardner, Rock Island Plow Company, Rock Island, Ill., chairman; H. T. Hornsby, United Iron Works Company, Springfield, Mo., vice-chairman; E. E. Baker, Kewanee Boiler Company, Kewanee, Ill.; W. H. Winslow, Winslow Brothers Company, Chicago; John B. Strauch, More-Jones Brass & Metal Company, St. Louis.

Sixth District—W. W. Coleman, Bucyrus Company, South Milwaukee, Wis., chairman; C. A. Luster, Clyde Iron Works, Duluth, vice-chairman; Max W. Babb, Allis-Chalmers Mfg. Company, Milwaukee; Fred M. Prescott, Prescott Company, Menominee, Mich.; John G. Osborne, Lakeside Malleable Castings Company, Racine, Wis.

Seventh District—John M. Taylor, Taylor-Forbes Company, Ltd., Guelph, Ont., chairman; W. F. Angus, Canadian Steel Foundries, Ltd., Montreal, vice-chairman; A. R. Goldie, Goldie McCulloch Company, Ltd., Galt, Ont.; Geo. W. Watts, Canada Foundry Company, Ltd., Toronto, Ont.; H. Cockshutt, Cockshutt Plow Company, Brantford, Ont.

Eighth District—W. D. Trabue, Phillips & Buttrif Mfg. Company, Nashville, Tenn., chairman; Z. W. Wheland, Wheland Company, Chattanooga, vice-chairman; W. D. Tynes, Hardie-Tynes Mfg. Company, Birmingham; E. Y. Hartwell, Hartwell Iron Works, Houston, Tex.; Geo. R. Lombard, Lombard Iron Works & Supply Company, Augusta, Ga.

A. E. McClintock, 29 South La Salle Street, Chicago, continues as commissioner of the association.

Book Reviews

Canadian Trade Index. Text pages, LXXIV + 400, 6½ x 10 in. Published by the Canadian Manufacturers' Association, Toronto. Price, \$5.

For all buyers of Canadian manufactured goods this index presents in alphabetical lists the most recent and complete information obtainable. It is divided into three parts, containing respectively the names of Canadian manufacturers, articles manufactured in Canada, together with the names of all firms producing them and an index in French of all such goods. This 1916-18 edition supplies over 2000 headings and nearly 3000 firm names not incorporated in other issues. To the name and address of every manufacturer appearing in the classified section have been added many valuable details, such as export representatives, branch offices, etc., not previously available. The index of French headings has been supplemented by the addition of the equivalent English headings, identical with those of the classified section. These have been altered in many cases to make them more descriptive and easier to find. Parts I and III are now printed on blue paper, making them easy to locate, which will be appreciated by hurried business men. Useful new features are the lists of Canadian trade commissioners, commercial agents and British consuls.

The Model T Ford Car. By Victor W. Pagé. Pages, 288, 4¾ x 7¼ in.; illustrations, 94. Published by the Norman W. Henley Publishing Company, 132 Nassau Street, New York City. Price, \$1.

This book, which is designed to supplement the instruction book of the builder, explains in considerable detail the operating principles of all parts of the Ford car and gives complete instructions for driving and maintenance. It is based upon the author's experience as a driver and considerable of the information included in the book has been obtained from first-hand sources.

The book is divided into but five chapters, the first of which is given over to a general description of the car, its parts and their functions. How the engine and its auxiliaries work is described in the second chapter, and details of the chassis parts are contained in chapter three. Instructions on driving, maintenance, overhauling and repairing are given in the two remaining chapters. The table of contents is quite complete, and with a list of illustrations arranged in numerical order make it possible to locate almost any subject readily. A comprehensive index is included.

Oxy-Acetylene Welding and Cutting. Pages, 190; 6¾ x 4¼ in.; illustrations, 76. Published by Frederick J. Drake & Co., Chicago, Ill. Price, \$1.

Every practical point in the process of welding and cutting with the oxy-acetylene flame has been carefully covered in this volume. The theory, however, has not been neglected. Illustrations have been incorporated in the book to cover every essential detail of the apparatus employed in these processes. It is a concise exposition of the field it covers and a valuable book for shop reference.

Edward Le Bas & Co., iron, steel and metal merchants and manufacturers, London, England, are issuing "the combination metric ready reckoner" for the purpose of facilitating the use of the metric system of weights and measures in foreign correspondence, etc. On a stout card are printed tables which enable the conversion to be readily made of practically all kinds of English weights and measures into metric equivalents or vice versa. These tables are ingeniously arranged so that the elements of conversion are found in small space. The card is designed for desk use.

The Stone & Webster Engineering Corporation, Boston, has issued a second edition of its brochure giving illustrations of industrial plants, office and educational buildings, power stations, warehouses, etc., which it has constructed. This edition comprises 56 plates, giving photographic reproductions of all kinds of construction, showing the wide scope of the engineering achievements of the company. The publication is bound in cloth and is a most creditable specimen of engraving and letter press.

ESTABLISHED 1855

THE IRON AGE

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GEO. W. COPE

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The New Movement of Employers

The formation of the National Industrial Conference Board, a new organization of employers, was announced in connection with the annual meeting of the National Founders' Association in New York last week and a session of the board was held on the second day of the foundrymen's convention. Public attention was directed to the new movement, which in reality was started more than six months ago, by newspaper headlines referring to 15,000 employing companies represented, having a capital of \$8,000,000,000 and employing 6,000,000 workers. With the railroad eight-hour law looming up as the foremost labor issue, it was easy for the newspapers to say that the Conference Board had been formed to take an active part in nullifying that measure, but this like other surmises fell far short of gaging the intent of the prime movers.

A full statement of the purpose of the Conference Board was given in the address of M. W. Alexander before the National Founders' Association, which was reproduced in THE IRON AGE last week. Mr. Alexander's activities in getting the movement under way have been masterly and his address was a notable review of a great program. Twelve national organizations of employers are represented by two members each on the National Conference Board, which becomes in effect a federation of trades, including metal-working, printing, wool, cotton, paper, rubber and other manufacturing lines. In the metal trades are the National Founders' Association, the National Metal Trades Association and the National Erectors' Association, while other manufacturers in the same and kindred lines are also represented through the National Association of Manufacturers and the National Council for Industrial Defense.

Various phases of the work thus undertaken at so significant a time for industry are touched upon in Mr. Alexander's prospectus. The wisdom of the founders appears in the appeal that will constantly be made in the work of the board to the intelligence of the public and to its sense of fair play. A "constructive study and equitable solution of economic issues in industry" is aimed at, and the facts are to be presented openly to legislators and the public so as to secure "by truthful publicity, intelligent sym-

pathy for all proper efforts for industrial development."

In concluding its outline of purpose, as put forth by its manager, the Conference Board asks for the co-operation of the Government, of the public, of the wage earners of the country and of the manufacturers who are members of the federated associations. The statement does not ignore the fact that many employers in the past have not taken a direct and intelligent interest in all the problems of labor and of industrial operations. The change of attitude of such employers certainly has come none too soon, and it is to be said of the whole movement, that has been so intelligently and effectively handled in its beginnings, that it comes at a most opportune time. It should exert no small influence for the right settlement of the economic questions involved in the momentous readjustment upon which the world is soon to enter.

Industrial questions are now at the front in national and State legislation. The cost of living, with all its complexities, is the crux of our national politics. When a small minority of railroad employees enforce their edict for higher wages through a law that means ultimately higher freight rates and higher commodities, the people should know just what has been done to them and how it came about. If limitation of output by labor union decree and the discarding of approved methods of manufacture through the influence of a small though well organized fraction of the workers of the country are imposing burdens upon the whole people, the responsibility for such high costs should become widely known, so that the people may apply the remedy.

The activities of the new federation should, and we believe will, enlist the co-operation of the best minds among the country's manufacturing employers. They have never had a greater call to service for their industries and their employees, nor for the rightly ordered prosperity of the whole people.

Speculation in Foundry Iron

The buying of foundry iron for delivery in the second half of 1917 at a 50 per cent advance over the price of three months ago represents a speculation that is scarcely matched in the market for finished steel. There have been large sales of rails for

that delivery, also considerable sales of ship plates, both for domestic consumption, and it is well known that the warring countries have bought steel here that will not be shipped until the second half of next year. But the average manufacturing consumer of steel products has bought little or nothing for so distant a delivery. He may not get in the next seven months all the material the mill has contracted to give him in that time, but, largely because steel makers have seen prices steadily climbing to unheard-of levels and now prefer to have next year's deliveries carry the prices of 1917 and not those of 1916, this is not a time of free buying in finished lines.

A good many foundry iron buyers have evidently been acting in the past four or five weeks on the belief that the pig-iron market is to repeat the performance of the steel market—to a degree, at least; that as in steel, foreign buying will be sufficient to cause a competition for the metal in place of the competition among furnaces for pig-iron orders which, in spite of a moderate advance in price, really describes the pig-iron market of 18 months previous to September. Southern iron in particular had dragged, at every effort of Northern foundry iron producers to get prices up. But just as soon as 250,000 tons of Alabama iron was sold for export, indicating a greater need abroad for our pig iron than had been suspected, the situation suddenly changed; domestic consumers started to cover, and under excited buying prices went up from \$1 to \$3 a week as has been seen throughout November.

In the steel trade the mills have long made an effort to confine forward contracts, in the case of manufacturers, to material covering work for which orders were actually in hand. Some of this month's buying of pig iron for the second half of next year has been by foundries which did not have on their books orders for castings for delivery in that period. The buyers reasoned that pig iron would go higher, perhaps stay higher for a good part of next year, and that castings would rise accordingly. There were, of course, buyers whose castings go into their own products for which they had orders ahead or counted on a continuing demand at profitable prices through next year. With such the speculative factor was not so great.

As foreign demand for our pig iron sent prices bounding up, partly from the fear that the unknown volume of foreign demand yet to come would cause a scarcity, so the extent of the foreign demand in 1917 will determine whether prices will advance farther. As in steel, the situation hinges on the continuance of the war. On its face the effect thus far produced upon prices has been large in proportion to the amount of the foreign buying. The case is not one of a present scarcity and of prices bounding up under prompt orders for iron for which the foundry is waiting. With steel steadily advancing, long after levels were reached which a year ago looked dangerous, there was the possibility that a world demand for American pig iron, following in the wake of the steel demand, would accentuate the advance already caused by the taking up of several hundred thousand tons of steel making and foundry irons for use abroad. Foundry users of pig iron, in other words, have at

length come into the same sort of war speculation in their buying that consumers of steel encountered more than a year ago. But there is an added factor of seriousness in that pig-iron contracts are real contracts and not options and have no guarantees against declines.

Hostility as a Labor Union Asset

The various resolutions passed at the Baltimore convention of the American Federation of Labor last week bristle with signs of an increasingly belligerent attitude. The prompt passing of the Adamson law on demand has evidently convinced the militant unions that they have been too mild heretofore. It matters little that the President made the cause of the railroad brotherhoods his own and brought Congress to his way of thinking. The American Federation of Labor flouts his suggestion of legislation "making illegal any railroad strike or lockout prior to the investigation of the merits of the case." The resolutions on this subject say that "this effort to again subject wage earners to involuntary servitude has aroused the determined resistance of wage earners generally," and further along we are told that "problems of industrial justice and redress for industrial wrongs cannot be worked out by laws."

Organized labor in the saddle does not want any problem worked out by law except it be the law of the union's will. Samuel Gompers, in his profane reference to the Constitution and the courts, has expressed what is increasingly the attitude of the militant union. It refuses arbitration of the railroad brotherhood demand because it has the power to stop the wheels of traffic. Its leaders want no improvement in the relations between employers and employees, because the power of the leaders depends upon keeping workmen under the belief that hostility is the natural feeling an employee should entertain toward his employer. Hence antagonism is breathed in every utterance of the Baltimore convention. Even what is said of the course of commodity prices, due to the war, is no exception, the resolution declaring that "among the chief beneficiaries of this abnormal situation are the bitterest enemies of organized labor."

The determination of labor leaders to appeal to passion and to play upon prejudice can only tend to make the employer-employee problem more hopeless. No doubt the war has intensified all antagonisms. Race hatreds in the United States have been made more bitter, and with war feeling in the air labor union leaders find it easier than ever to fall into the speech of war. The hatreds they are engendering, if not allayed by counsels of moderation and reason, must have a fearful reckoning.

Among employers' associations in recent years, on the contrary, there has been an increasing disposition to cultivate fairness. The welfare and pecuniary interest of employees have never had more thought from the leaders in great industries nor more favorable action than has marked the last decade. It may be that the progress of the open shop and the response made by labor to the advances of fair-minded employers have all the more embittered the heads of labor unions; but whatever the incitement, they are no more in the way of gaining a lasting advantage to those they represent than

militarism is on the road to bringing good will to Europe.

Arbitration, co-operation, conference and con-

ciliation one day had a place in the lexicon of organized labor. Their disappearance, under the rule of the leaders of to-day, is no hopeful sign.

Business Measures to Come Before Congress

Co-operation on Exports Likely to
Be Made Lawful—More Railroad Legis-
lation—Aid for Vocational Training

WASHINGTON, D. C., Nov. 21, 1916.—The Congress which will meet Dec. 4 will face a legislative program of unusual importance for a short session and one in which the business men of the country will be deeply interested. The measures to be taken up will be strongly urged upon both houses by the President in a brief but emphatic address which is already in course of preparation. The chief measures to which Congress will give consideration will be the Webb bill permitting combinations of exporters for the development of foreign trade, a more or less comprehensive bill extending the federal regulation of common carriers, a measure authorizing federal assistance and co-operation in providing for vocational education, a bill regulating immigration, several measures providing for the conservation of the mineral resources, of the forests and the water-power of the country, and a so-called corrupt practices bill intended to further limit the use of money in the elections. The regular annual appropriation bills will necessarily be given the right of way and those providing for the army and navy as well as the urgent deficiency bill, which will probably authorize increased limits of cost for a part of the new naval program, will contain provisions of unusual interest to the readers of THE IRON AGE.

WEBB BILL WITH THE ADMINISTRATION'S HELP

Every day that has passed since Congress adjourned has emphasized the importance of the enactment of the Webb bill amending the anti-trust laws so as to permit manufacturers and exporters to combine in their campaigns for foreign business. This bill was hurried through the House in the closing days of the last session, but failed of passage by the Senate. Since the adjournment of Congress the belligerent countries of Europe have given additional evidence of their intention to recoup their trade losses after the war and to employ the most drastic measures to that end. Administration officials who, while advocating the passage of the Webb bill in response to a widespread sentiment in its favor, were not particularly enthusiastic about it, are now determined to put behind it every possible influence to insure its final passage this winter. That the bill will be strongly opposed by certain Senators who have long made capital out of their opposition to every form of trade combination is fully anticipated here, and in view of the legislation to be crowded into less than three months it is recognized that the passage of the Webb bill will be no holiday task. Nevertheless, Administration leaders in the Senate express full confidence in their ability to put it through.

The character of the railroad legislation to be urged by the Administration will depend largely upon the work of the joint Congressional committee on railroad regulation, which began public hearings in this city yesterday. It will also be influenced somewhat by developments in the contest over the constitutionality of the Adamson act recently begun by the leading railroad systems of the country and the course that may be pursued by the labor organizations affected by that extraordinary statute. It is improbable that the conclusions of the joint Congressional committee concerning the broad questions relating to federal regulation of the carriers now before it will be formulated in time for consideration at the coming session, but inasmuch as the entire membership of the joint committee is taken from the Senate and House committees on

interstate commerce, which will have jurisdiction of all railroad legislation to be attempted at the coming session, there can be no doubt that the measures enacted this winter will be strongly influenced by the joint committee's work. There is no expectation here that the constitutionality of the Adamson law will be determined by the courts in time for the enactment of amendatory legislation predicated on the court rulings, but it is quite probable that an attempt will be made by certain Congressional leaders to meet the attack on the Adamson bill already begun by the railroads.

FEDERAL AID FOR VOCATIONAL TRAINING

President Wilson is reported to be greatly interested in the subject of federal aid for vocational education and to have secured pledges from Administration leaders in Congress to make at least a beginning in this direction at the coming session. The general plan of providing for the co-operation of the national Government with the States in developing this important branch of the education of the young has been strongly indorsed by many organizations of business men, notably by the National Chamber of Commerce, which through a referendum has secured the almost unanimous approval of the many trade bodies affiliated with it. The appropriation now sought is not large, but is likely to be the forerunner of very considerable expenditures.

The convening of the new session will be the signal for the reopening of the struggle so bitterly contested during the past three years to force through a bill restricting immigration and providing a literacy test. This measure possesses international aspects especially with reference to the principal countries of the Orient, and on that account will encounter adverse influences of an unusual character. The Administration will again antagonize the literacy clause and there is every reason to believe that if it is included the President will once more veto the measure.

There is little or no opposition to the conservation measures to be urged at the coming session and their passage will therefore depend almost entirely upon the ability of those having them in charge to secure consideration for them. They are not of vital importance, but the Administration is very anxious to secure the early passage of the bill regulating the use of water-power, which is of considerable interest from an industrial as well as a conservation standpoint.

The Administration leaders are pledged to give early consideration to Senator Owen's corrupt practices bill, the purpose of which is to regulate and to some extent restrict the use of money in campaigns for the election of federal officers. The passage of the bill during the session seems probable.

MORE MONEY FOR SCOUT CRUISERS

The urgent deficiency appropriation bill, which will be one of the first measures to be considered by the House at the coming session, will probably contain an authorization to increase the allotments for the four scout cruisers provided by the last naval appropriation act, the Navy Department having found it impossible to secure bids for these vessels within the statutory limit of cost. As soon as this measure is disposed of work will be begun in earnest on the naval budget bill, which will probably precipitate a fight in the House committee to reduce the scale of expenditure inaugu-

rated at the last session. Whatever may be done with the naval bill in the House, however, it is the best opinion here that the Senate will successfully resist any attempt at curtailing the program.

The uncertainty as to whether the Republicans or the Democrats will control the organization of the House in the Sixty-fifth Congress, chosen Nov. 7, will be an important incentive to the Administration to secure the enactment of its entire legislative program at the coming session. On the face of the returns the Senate will be Democratic by a majority of 8 or 10, while in the House the Republicans will have a plurality of 4 or 5, but not a majority over all, the balance of power being held by a handful of nondescripts, including Socialists, Independents, Progressives, Progressive Protectionists, etc.

W. L. C.

CORRESPONDENCE

What Is Gray Iron?

To the Editor: The paper on "What Is Gray Iron?" read at the November meeting of the Philadelphia Foundrymen's Association brought out considerable discussion. It was the sense of the meeting that a general expression of opinion was desirable. There will be a further discussion of the question at the next meeting of the association to be held at the Manufacturers' Club, Wednesday, Dec. 6, at 8 p. m. It would be much appreciated if those interested could be there and present their views, or, if that is not possible, if they will write to the undersigned or to Howard Evans, secretary, 1021 North Delaware Avenue, we will be glad to read their letters at that meeting.

GEORGE C. DAVIS.

33 South Tenth Street, Philadelphia, Nov. 14, 1916.

A Car Distribution Commission

Shortly before the adjournment of the Interstate Commerce Commission inquiry into the car shortage at Louisville, Ky., on Tuesday, Nov. 21, it was announced that a permanent commission, which hereafter will control the car-distribution problems, had been created, to sit at Washington and to work as a supplementary body to the Interstate Commission. George Hodges, chairman of the Committee on Relations Between Railroads of the American Railway Association, has been named chairman of this commission. Fayette B. Dow, attorney-examiner of the Commerce Commission, will be the Commerce Commission member, and five other members, executives of railroads, will complete the list. This body, findings of which will be given the approval of the Commerce Commission, will be authorized to control the distribution of freight cars, to fix per-diem charges for use by railroads of equipment of other roads, and to assess demurrage rates as may seem to it proper. It was called to meet Thursday, Nov. 23, and take action on the matter of increasing the present 45-cent-per-diem charge to \$1.25 and on the proposed progressive demurrage charge. Hereafter it will be relied on to prevent the development of a situation so acute as that lately disclosed.

Increased Demurrage Tariffs Suspended

WASHINGTON, D. C., Nov. 21, 1916.—The Interstate Commerce Commission to-day suspended until March 31 tariffs filed by the railroads in official, Southern and Western classification territories proposing increased demurrage charges to check the freight car shortage. The present demurrage charge of nearly all the roads is \$1 per day after free time allowance. The proposed tariffs increased the charges to \$2 for the first day after free time, \$3 for the second day, \$4 for the third day, and \$5 for the fourth and each succeeding day.

The R. E. Ellis Engineering Company, 549 Washington Boulevard, Chicago, announces its incorporation and the election of Frederick Fisher, formerly with the Bucyrus Company, as vice-president and treasurer. It is marketing various manufacturing tool attachments.

A THIRD WAGE ADVANCE

The Steel Corporation Announces a Ten Per Cent Increase

Following the meeting of the Finance Committee of the United States Steel Corporation on Tuesday, Nov. 21, Chairman E. H. Gary made the following statement:

"Ordinarily the question of wages would not come up for consideration or decision at this time of the year, but in consequence of the abnormal conditions now existing it has been decided to increase the wage rates of our iron and steel companies about 10 per cent, to take effect Dec. 15. As to other departments, increases will be equitably proportioned."

It has been estimated that the average increase under the new rate of pay will be around \$9 a month for the 260,000 persons now employed by the Steel Corporation, the understanding being that employees in clerical positions will participate, which has not always been the case when steel works wages have been increased. The 10 per cent advance now made is the third of that amount for 1916, the first becoming effective Feb. 1 and the second on May 1. The hourly base rate for common labor went to 22c. on Feb. 1, to 24.2c. on May 1 and will now be 2.67c., or \$2.67 for a 10-hour day. In the Pittsburgh and Valley districts 27½c. has been paid to many laborers for some time.

The New York Times gives the following statistics showing the Steel Corporation pay-roll and number of employees in the first six months of 1916, also the wages paid in the past five years:

1916	Employees	Payroll
January	232,540	\$17,982,866
February	240,195	19,438,350
March	247,043	21,187,125
April	244,459	19,830,414
May	258,773	23,372,133
June	258,268	22,978,408

Total wages for 6 months..... \$124,789,296

Wages for Last Five Years

1915	191,126	\$176,800,863
1914	179,353	162,379,906
1913	228,906	207,206,176
1912	221,025	189,351,601
1911	196,888	161,419,031

At Pittsburgh it is stated that independent steel manufacturers will make wage advances averaging 10 per cent and effective in December.

The Brier Hill Steel Company gave notice on Nov. 22 of an advance of approximately 10 per cent to all employees, effective Dec. 15.

Magnitude of the Mining Industry

In an address before the nineteenth annual convention of the American Mining Congress, at Chicago, Nov. 14, C. A. Tupper of the *Mining World* said that for the ten years preceding the European war the average value of mineral products in the United States was about \$1,980,000,000 a year. In 1913, the last normal year, it reached \$2,439,159,728. With the stress of war demand, and the rise in prices, it has increased to \$4,300,000,000 (estimated) for 1916. Equipment and supplies utilized in mining aggregated not less than \$7,200,000,000 in the decade previous to the war, and now equal \$900,000,000 or more each year. About 1,825,000 men are employed in the mines and oil fields of the country. Only 167 companies make public their dividends. These divided among shareholders, between Jan. 1 and Oct. 31, this year, \$184,830,127.

The Ford Motor Company, Detroit, Mich., has placed contracts for an ore-handling plant to be erected in connection with the two blast furnaces that it will build near Detroit to supply metal for castings for its automobile and tractor plants. The ore-handling plant will include two Hulett unloaders equipped with 12-ton buckets, that will be built by the Wellman-Seaver-Morgan Company, Cleveland, and two 10-ton bridges, to be furnished by the Mead-Morrison Mfg. Company, East Boston, Mass.

All Munitions Work by the Government

Purpose of the Investigation to Be Made by the Special Board Just Appointed by the Secretary of War

WASHINGTON, D. C., Nov. 20, 1916.—The announcement of the Secretary of War on Nov. 17 that a special board had been appointed "to investigate the advisability of complete Government manufacture of munitions" has aroused the liveliest interest here, and further investigation of the matter has developed an extraordinary situation. The board consists of five members as follows: Colonel Kernan, 28th Infantry; Lieutenant Summerall, Field Artillery; Major Fuller; Benedict Crowell of Cleveland, Ohio, and R. G. Rhett of Charleston, S. C. The three army officers are well known experts in ordnance matters, Mr. Crowell is a chemist and metallurgist with considerable experience industrially, while Mr. Rhett has long been prominent in banking and business circles, and is now president of the Chamber of Commerce of the United States.

The special board has been appointed by the Secretary of War in accordance with a provision of the national defense act of June 3, 1916, as follows:

The Secretary of War is hereby authorized to appoint a board of five citizens, two of whom shall be civilians and three of whom shall be officers of the army, to investigate and report to him the feasibility, desirability and practicability of the Government manufacturing arms, munitions and equipment, showing in said report the comparative prices of the arms, munitions and equipment manufactured in Government plants and those manufactured in private plants, the amount of money necessary to build and operate Government plants for the manufacture of arms, munitions and equipment; showing also what the Government plants and arsenals are now doing in the way of manufacturing arms, munitions and equipment, and what saving has accrued to the Government by reason of its having manufactured a large part of its own arms, munitions and equipment for the last four years. And the Secretary of War is hereby directed to transmit said report to Congress on or before January 1, 1917.

The provision above quoted was incorporated in the national defense act at the instance of a contingent of members of the House of Representatives led by Messrs. Tavenner and Buchanan of Illinois, who have insisted that the Government should manufacture all the war material it may at any time require. The principal argument put forward in support of this policy has been that it would "remove the temptation" from private manufacturers of munitions to foment international discord "in order that they may make money out of war." The real reason behind this movement—at least so far as members of the Tavenner-Buchanan type are concerned—is the desire to make large increases in the forces of workmen employed at the Government arsenals. Organized labor has long favored this policy and can be relied upon, to some extent, to advance the political fortunes of Congressmen who advocate these theories. How fickle the favor of labor leaders is frequently found to be is aptly illustrated by the fact that both Mr. Tavenner and Mr. Buchanan were beaten in the recent Congressional elections.

APPOINTMENTS MADE SUDDENLY

Immediately upon the approval of the national defense act by the President, General Crozier, chief ordnance officer, made a careful study of its provisions to determine the scope of the additional responsibilities placed upon his bureau. Realizing the magnitude of the task intrusted to the proposed board authorized to investigate the big question of the manufacture of munitions, he at once prepared an estimate for an appropriation to cover the expenses of the board which he foresaw would amount to a comparatively large sum. This estimate was transmitted to Congress to be included in one of the deficiency appropriation bills, but Congress rejected the item, thereby leaving the department without funds with which to carry on the inquiry.

Examination of the terms of the provision of law re-

lating to the board suggested that inasmuch as the Secretary of War was merely "authorized" to create such a body the statute was intended to be permissive and not mandatory. This view appears to have operated to postpone action under the statute, but it is understood that the attention of the Secretary of War having recently been drawn to the fact that he is "directed" to transmit the board's report to Congress on or before Jan. 1, 1917, a date but six weeks off, he thereupon decided to appoint the board without further delay.

Inquiry at the War Department elicits the statement that no plans have yet been formulated for the work of the board, and that the Government is without any appropriation from which to defray the cost of one of the most comprehensive and expensive undertakings ever attempted by the Ordnance Bureau. Huge engineering problems involving elaborate cost accounting systems are contemplated in the language of the law, and it goes without saying that it will be physically impossible adequately to perform the task in the allotted time. It seems more than probable that the board will be obliged to treat the whole subject academically and to make a report based upon a very superficial inquiry.

PRIVATE CONTRACTS FAVORED

The attitude of the Ordnance Bureau upon the main points which the board is instructed to investigate can be authoritatively stated. Both General Crozier and former Secretary of War Garrison, in the executive session hearings before the Military and Appropriations committees of the House and Senate at the last session, expressed themselves with great freedom and emphasis on the subject. All the manufacturing departments of the arsenals, they contended, should be developed by the installation of the most up-to-date equipment to capacities equal to the production of a substantial part of the munitions that might be required in any emergency. Having attained this degree of expansibility, however, the Government establishments should be operated only on a scale necessary to keep the equipment in good running order. The requirements of the Government, in addition to the output of the arsenals, should be met, both General Crozier and Secretary Garrison insisted, by placing orders with private concerns, which would thus be encouraged to maintain their plants and especially to study the problems involved in making munitions to United States army standards. Such a policy, the Congressional committees were told, would result in giving the Government a series of well-equipped establishments of its own capable of great expansion in an emergency, supplemented by the facilities of a considerable number of large private establishments fitted up to co-operate with the War Department on an enormous scale and on the shortest possible notice.

PRIVATE CONCERNS A CHECK ON ARSENALS

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whether production is carried on economically or not. It is almost impossible for anybody to say whether the Ordnance Department is manufacturing economically those things which it procures solely by manufacture or whether it is manufacturing extravagantly. I have been Chief of Ordnance for thirteen years, and I have never had an inspection which would be of the slightest utility in disclosing whether or not our manufacturing is carried on economically or extravagantly, except my own inspections which are carried on within the department, and not from the outside."

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CONTENTS

Cast-Iron Pipe Manufacture in the South.....	1159
The Lyons Sample Fair.....	1162
Status of Naval Awards.....	1163
Bids and Awards for U. S. Shells.....	1163
A Vertical Tapping Machine for Dies.....	1164
Heavy-Duty Vertical Drilling Machine.....	1165
The Electric Motor in the Steel Mill.....	1166
A Universal Flue Welding Machine.....	1170
Inclosed Headstock Roll Turning Lathe.....	1171
National Founders' Association Meeting.....	1172
Book Reviews	1177
Editorials:	
The New Movement of Employers.....	1178
Speculation in Foundry Iron.....	1178
Hostility as a Labor Union Asset.....	1179
Business Measures to Come Before Congress.....	1180
Correspondence	1181
A Car Distribution Commission.....	1181
Increased Demurrage Tariffs Suspended.....	1181
A Third Wage Advance.....	1181
Magnitude of the Mining Industry.....	1181
All Munitions Work by the Government.....	1182
Armor Plate Awards to Bethlehem and Carnegie Companies	1183
Durability of Stainless Steel	1183
Preparation for Export Trade with Russia.....	1184
An Italian Magnesite Deposit.....	1185
Russia's Railroad Needs After the War.....	1185
Iron and Steel Markets	1186
Fabricated Steel Work in October.....	1197
Manganese Ore Imports at Record Rate.....	1197
Finished Iron and Steel Prices, Pittsburgh.....	1198
Metal Markets	1199
The World's Pig-Iron Output.....	1200
New York Shipbuilding Company Sold.....	1200
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Fall Meeting of New Haven Engineers.....	1202
Crucible Steel Company of America's Officers.....	1202
Pittsburgh Foundrymen's Association.....	1202
Pittsburgh and Nearby Districts.....	1203
The Engineering Library in New York.....	1203
Judicial Decisions	1204
Iron and Industrial Stocks.....	1205
Scandinavian and Russian Trade Service.....	1205
Machinists' Strikes in New York and New Jersey.....	1205
Becker Milling Machine Company Sold.....	1205
Record Exports of Locomotives.....	1205
Machinery Markets and News of the Works.....	1206
New Trade Publications	1214

Durability of Stainless Steel

The way in which stainless steel has stood the test of use for more than two years has dispelled doubts as to its real and permanent value, says the *London Ironmonger*. The only criticism heard is that the cutting capacity, as in knives, is inferior to that of ordinary steel. Knives which have been in daily use for 16 to 18 months retain a surface as brilliant as when they left the polisher's hands although they have never been rubbed or cleaned by polishes. Prices of stainless cutlery have been advanced 15 or 20 per cent because of the advances in steel. The new steel, a chromium alloy steel, is not only expensive but it is costly to work up. The saving, however, is very considerable.

militarism is on the road to bringing good will to Europe.

Arbitration, co-operation, conference and con-

ciliation one day had a place in the lexicon of organized labor. Their disappearance, under the rule of the leaders of to-day, is no hopeful sign.

Business Measures to Come Before Congress

Co-operation on Exports Likely to
Be Made Lawful—More Railroad Legis-
lation—Aid for Vocational Training

WASHINGTON, D. C., Nov. 21, 1916.—The Congress which will meet Dec. 4 will face a legislative program of unusual importance for a short session and one in which the business men of the country will be deeply interested. The measures to be taken up will be strongly urged upon both houses by the President in a brief but emphatic address which is already in course of preparation. The chief measures to which Congress will give consideration will be the Webb bill permitting combinations of exporters for the development of foreign trade, a more or less comprehensive bill extending the federal regulation of common carriers, a measure authorizing federal assistance and co-operation in providing for vocational education, a bill regulating immigration, several measures providing for the conservation of the mineral resources, of the forests and the water-power of the country, and a so-called corrupt practices bill intended to further limit the use of money in the elections. The regular annual appropriation bills will necessarily be given the right of way and those providing for the army and navy as well as the urgent deficiency bill, which will probably authorize increased limits of cost for a part of the new naval program, will contain provisions of unusual interest to the readers of THE IRON AGE.

WEBB BILL WITH THE ADMINISTRATION'S HELP

Every day that has passed since Congress adjourned has emphasized the importance of the enactment of the Webb bill amending the anti-trust laws so as to permit manufacturers and exporters to combine in their campaigns for foreign business. This bill was hurried through the House in the closing days of the last session, but failed of passage by the Senate. Since the adjournment of Congress the belligerent countries of Europe have given additional evidence of their intention to recoup their trade losses after the war and to employ the most drastic measures to that end. Administration officials who, while advocating the passage of the Webb bill in response to a widespread sentiment in its favor, were not particularly enthusiastic about it, are now determined to put behind it every possible influence to insure its final passage this winter. That the bill will be strongly opposed by certain Senators who have long made capital out of their opposition to every form of trade combination is fully anticipated here, and in view of the legislation to be crowded into less than three months it is recognized that the passage of the Webb bill will be no holiday task. Nevertheless, Administration leaders in the Senate express full confidence in their ability to put it through.

The character of the railroad legislation to be urged by the Administration will depend largely upon the work of the joint Congressional committee on railroad regulation, which began public hearings in this city yesterday. It will also be influenced somewhat by developments in the contest over the constitutionality of the Adamson act recently begun by the leading railroad systems of the country and the course that may be pursued by the labor organizations affected by that extraordinary statute. It is improbable that the conclusions of the joint Congressional committee concerning the broad questions relating to federal regulation of the carriers now before it will be formulated in time for consideration at the coming session, but inasmuch as the entire membership of the joint committee is taken from the Senate and House committees on

interstate commerce, which will have jurisdiction of all railroad legislation to be attempted at the coming session, there can be no doubt that the measures enacted this winter will be strongly influenced by the joint committee's work. There is no expectation here that the constitutionality of the Adamson law will be determined by the courts in time for the enactment of amendatory legislation predicated on the court rulings, but it is quite probable that an attempt will be made by certain Congressional leaders to meet the attack on the Adamson bill already begun by the railroads.

FEDERAL AID FOR VOCATIONAL TRAINING

President Wilson is reported to be greatly interested in the subject of federal aid for vocational education and to have secured pledges from Administration leaders in Congress to make at least a beginning in this direction at the coming session. The general plan of providing for the co-operation of the national Government with the States in developing this important branch of the education of the young has been strongly indorsed by many organizations of business men, notably by the National Chamber of Commerce, which through a referendum has secured the almost unanimous approval of the many trade bodies affiliated with it. The appropriation now sought is not large, but is likely to be the forerunner of very considerable expenditures.

The convening of the new session will be the signal for the reopening of the struggle so bitterly contested during the past three years to force through a bill restricting immigration and providing a literacy test. This measure possesses international aspects especially with reference to the principal countries of the Orient, and on that account will encounter adverse influences of an unusual character. The Administration will again antagonize the literacy clause and there is every reason to believe that if it is included the President will once more veto the measure.

There is little or no opposition to the conservation measures to be urged at the coming session and their passage will therefore depend almost entirely upon the ability of those having them in charge to secure consideration for them. They are not of vital importance, but the Administration is very anxious to secure the early passage of the bill regulating the use of water-power, which is of considerable interest from an industrial as well as a conservation standpoint.

The Administration leaders are pledged to give early consideration to Senator Owen's corrupt practices bill, the purpose of which is to regulate and to some extent restrict the use of money in campaigns for the election of federal officers. The passage of the bill during the session seems probable.

MORE MONEY FOR SCOUT CRUISERS

The urgent deficiency appropriation bill, which will be one of the first measures to be considered by the House at the coming session, will probably contain an authorization to increase the allotments for the four scout cruisers provided by the last naval appropriation act, the Navy Department having found it impossible to secure bids for these vessels within the statutory limit of cost. As soon as this measure is disposed of work will be begun in earnest on the naval budget bill, which will probably precipitate a fight in the House committee to reduce the scale of expenditure in nau-

rated at the last session. Whatever may be done with the naval bill in the House, however, it is the best opinion here that the Senate will successfully resist any attempt at curtailing the program.

The uncertainty as to whether the Republicans or the Democrats will control the organization of the House in the Sixty-fifth Congress, chosen Nov. 7, will be an important incentive to the Administration to secure the enactment of its entire legislative program at the coming session. On the face of the returns the Senate will be Democratic by a majority of 8 or 10, while in the House the Republicans will have a plurality of 4 or 5, but not a majority over all, the balance of power being held by a handful of nondescripts, including Socialists, Independents, Progressives, Progressive Protectionists, etc.

W. L. C.

CORRESPONDENCE

What Is Gray Iron?

To the Editor: The paper on "What Is Gray Iron?" read at the November meeting of the Philadelphia Foundrymen's Association brought out considerable discussion. It was the sense of the meeting that a general expression of opinion was desirable. There will be a further discussion of the question at the next meeting of the association to be held at the Manufacturers' Club, Wednesday, Dec. 6, at 8 p. m. It would be much appreciated if those interested could be there and present their views, or, if that is not possible, if they will write to the undersigned or to Howard Evans, secretary, 1021 North Delaware Avenue, we will be glad to read their letters at that meeting.

GEORGE C. DAVIS.

39 South Tenth Street, Philadelphia, Nov. 14, 1916.

A Car Distribution Commission

Shortly before the adjournment of the Interstate Commerce Commission inquiry into the car shortage at Louisville, Ky., on Tuesday, Nov. 21, it was announced that a permanent commission, which hereafter will control the car-distribution problems, had been created, to sit at Washington and to work as a supplementary body to the Interstate Commission. George Hodges, chairman of the Committee on Relations Between Railroads of the American Railway Association, has been named chairman of this commission. Fayette B. Dow, attorney-examiner of the Commerce Commission, will be the Commerce Commission member, and five other members, executives of railroads, will complete the list. This body, findings of which will be given the approval of the Commerce Commission, will be authorized to control the distribution of freight cars, to fix per-diem charges for use by railroads of equipment of other roads, and to assess demurrage rates as may seem to it proper. It was called to meet Thursday, Nov. 23, and take action on the matter of increasing the present 45-cent-per-diem charge to \$1.25 and on the proposed progressive demurrage charge. Hereafter it will be relied on to prevent the development of a situation so acute as that lately disclosed.

Increased Demurrage Tariffs Suspended

WASHINGTON, D. C., Nov. 21, 1916.—The Interstate Commerce Commission to-day suspended until March 31 tariffs filed by the railroads in official, Southern and Western classification territories proposing increased demurrage charges to check the freight car shortage. The present demurrage charge of nearly all the roads is \$1 per day after free time allowance. The proposed tariffs increased the charges to \$2 for the first day after free time, \$3 for the second day, \$4 for the third day, and \$5 for the fourth and each succeeding day.

The R. E. Ellis Engineering Company, 549 Washington Boulevard, Chicago, announces its incorporation and the election of Frederick Fisher, formerly with the Bucyrus Company, as vice-president and treasurer. It is marketing various manufacturing tool attachments.

A THIRD WAGE ADVANCE

The Steel Corporation Announces a Ten Per Cent Increase

Following the meeting of the Finance Committee of the United States Steel Corporation on Tuesday, Nov. 21, Chairman E. H. Gary made the following statement:

"Ordinarily the question of wages would not come up for consideration or decision at this time of the year, but in consequence of the abnormal conditions now existing it has been decided to increase the wage rates of our iron and steel companies about 10 per cent, to take effect Dec. 15. As to other departments, increases will be equitably proportioned."

It has been estimated that the average increase under the new rate of pay will be around \$9 a month for the 260,000 persons now employed by the Steel Corporation, the understanding being that employees in clerical positions will participate, which has not always been the case when steel works wages have been increased. The 10 per cent advance now made is the third of that amount for 1916, the first becoming effective Feb. 1 and the second on May 1. The hourly base rate for common labor went to 22c. on Feb. 1, to 24.2c. on May 1 and will now be 2.67c., or \$2.67 for a 10-hour day. In the Pittsburgh and Valley districts 27½c. has been paid to many laborers for some time.

The New York Times gives the following statistics showing the Steel Corporation pay-roll and number of employees in the first six months of 1916, also the wages paid in the past five years:

1916	Employees	Payroll
January	232,540	\$17,982,866
February	240,195	19,438,350
March	247,043	21,187,125
April	244,459	19,830,414
May	258,773	23,372,133
June	258,268	22,978,408
Total wages for 6 months.....		\$124,789,296

Wages for Last Five Years	
1915	\$176,800,863
1914	162,379,906
1913	207,206,176
1912	189,351,601
1911	161,419,031

At Pittsburgh it is stated that independent steel manufacturers will make wage advances averaging 10 per cent and effective in December.

The Brier Hill Steel Company gave notice on Nov. 22 of an advance of approximately 10 per cent to all employees, effective Dec. 15.

Magnitude of the Mining Industry

In an address before the nineteenth annual convention of the American Mining Congress, at Chicago, Nov. 14, C. A. Tupper of the *Mining World* said that for the ten years preceding the European war the average value of mineral products in the United States was about \$1,980,000,000 a year. In 1913, the last normal year, it reached \$2,439,159,728. With the stress of war demand, and the rise in prices, it has increased to \$4,300,000,000 (estimated) for 1916. Equipment and supplies utilized in mining aggregated not less than \$7,200,000,000 in the decade previous to the war, and now equal \$900,000,000 or more each year. About 1,825,000 men are employed in the mines and oil fields of the country. Only 167 companies make public their dividends. These divided among shareholders, between Jan. 1 and Oct. 31, this year, \$184,830,127.

The Ford Motor Company, Detroit, Mich., has placed contracts for an ore-handling plant to be erected in connection with the two blast furnaces that it will build near Detroit to supply metal for castings for its automobile and tractor plants. The ore-handling plant will include two Hulett unloaders equipped with 12-ton buckets, that will be built by the Wellman-Seaver-Morgan Company, Cleveland, and two 10-ton bridges, to be furnished by the Mead-Morrison Mfg. Company, East Boston, Mass.

All Munitions Work by the Government

Purpose of the Investigation to Be Made by the Special Board Just Appointed by the Secretary of War

WASHINGTON, D. C., Nov. 20, 1916.—The announcement of the Secretary of War on Nov. 17 that a special board had been appointed "to investigate the advisability of complete Government manufacture of munitions" has aroused the liveliest interest here, and further investigation of the matter has developed an extraordinary situation. The board consists of five members as follows: Colonel Kernan, 28th Infantry; Lieutenant Summerall, Field Artillery; Major Fuller; Benedict Crowell of Cleveland, Ohio, and R. G. Rhett of Charleston, S. C. The three army officers are well known experts in ordnance matters, Mr. Crowell is a chemist and metallurgist with considerable experience industrially, while Mr. Rhett has long been prominent in banking and business circles, and is now president of the Chamber of Commerce of the United States.

The special board has been appointed by the Secretary of War in accordance with a provision of the national defense act of June 3, 1916, as follows:

The Secretary of War is hereby authorized to appoint a board of five citizens, two of whom shall be civilians and three of whom shall be officers of the army, to investigate and report to him the feasibility, desirability and practicability of the Government manufacturing arms, munitions and equipment, showing in said report the comparative prices of the arms, munitions and equipment manufactured in Government plants and those manufactured in private plants, the amount of money necessary to build and operate Government plants for the manufacture of arms, munitions and equipment; showing also what the Government plants and arsenals are now doing in the way of manufacturing arms, munitions and equipment, and what saving has accrued to the Government by reason of its having manufactured a large part of its own arms, munitions and equipment for the last four years. And the Secretary of War is hereby directed to transmit said report to Congress on or before January 1, 1917.

The provision above quoted was incorporated in the national defense act at the instance of a contingent of members of the House of Representatives led by Messrs. Tavenner and Buchanan of Illinois, who have insisted that the Government should manufacture all the war material it may at any time require. The principal argument put forward in support of this policy has been that it would "remove the temptation" from private manufacturers of munitions to foment international discord "in order that they may make money out of war." The real reason behind this movement—at least so far as members of the Tavenner-Buchanan type are concerned—is the desire to make large increases in the forces of workmen employed at the Government arsenals. Organized labor has long favored this policy and can be relied upon, to some extent, to advance the political fortunes of Congressmen who advocate these theories. How fickle the favor of labor leaders is frequently found to be is aptly illustrated by the fact that both Mr. Tavenner and Mr. Buchanan were beaten in the recent Congressional elections.

APPOINTMENTS MADE SUDDENLY

Immediately upon the approval of the national defense act by the President, General Crozier, chief ordnance officer, made a careful study of its provisions to determine the scope of the additional responsibilities placed upon his bureau. Realizing the magnitude of the task intrusted to the proposed board authorized to investigate the big question of the manufacture of munitions, he at once prepared an estimate for an appropriation to cover the expenses of the board which he foresaw would amount to a comparatively large sum. This estimate was transmitted to Congress to be included in one of the deficiency appropriation bills, but Congress rejected the item, thereby leaving the department without funds with which to carry on the inquiry.

Examination of the terms of the provision of law re-

lating to the board suggested that inasmuch as the Secretary of War was merely "authorized" to create such a body the statute was intended to be permissive and not mandatory. This view appears to have operated to postpone action under the statute, but it is understood that the attention of the Secretary of War having recently been drawn to the fact that he is "directed" to transmit the board's report to Congress on or before Jan. 1, 1917, a date but six weeks off, he thereupon decided to appoint the board without further delay.

Inquiry at the War Department elicits the statement that no plans have yet been formulated for the work of the board, and that the Government is without any appropriation from which to defray the cost of one of the most comprehensive and expensive undertakings ever attempted by the Ordnance Bureau. Huge engineering problems involving elaborate cost accounting systems are contemplated in the language of the law, and it goes without saying that it will be physically impossible adequately to perform the task in the allotted time. It seems more than probable that the board will be obliged to treat the whole subject academically and to make a report based upon a very superficial inquiry.

PRIVATE CONTRACTS FAVORED

The attitude of the Ordnance Bureau upon the main points which the board is instructed to investigate can be authoritatively stated. Both General Crozier and former Secretary of War Garrison, in the executive session hearings before the Military and Appropriations committees of the House and Senate at the last session, expressed themselves with great freedom and emphasis on the subject. All the manufacturing departments of the arsenals, they contended, should be developed by the installation of the most up-to-date equipment to capacities equal to the production of a substantial part of the munitions that might be required in any emergency. Having attained this degree of expansibility, however, the Government establishments should be operated only on a scale necessary to keep the equipment in good running order. The requirements of the Government, in addition to the output of the arsenals, should be met, both General Crozier and Secretary Garrison insisted, by placing orders with private concerns, which would thus be encouraged to maintain their plants and especially to study the problems involved in making munitions to United States army standards. Such a policy, the Congressional committees were told, would result in giving the Government a series of well-equipped establishments of its own capable of great expansion in an emergency, supplemented by the facilities of a considerable number of large private establishments fitted up to co-operate with the War Department on an enormous scale and on the shortest possible notice.

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CONTENTS

Cast-Iron Pipe Manufacture in the South.....	1159
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Status of Naval Awards.....	1163
Bids and Awards for U. S. Shells.....	1163
A Vertical Tapping Machine for Dies.....	1164
Heavy-Duty Vertical Drilling Machine.....	1165
The Electric Motor in the Steel Mill.....	1166
A Universal Flue Welding Machine.....	1170
Inclosed Headstock Roll Turning Lathe.....	1171
National Founders' Association Meeting.....	1172
Book Reviews	1177
Editorials:	
The New Movement of Employers.....	1178
Speculation in Foundry Iron.....	1178
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Correspondence	1181
A Car Distribution Commission.....	1181
Increased Demurrage Tariffs Suspended.....	1181
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Fabricated Steel Work in October.....	1197
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Iron and Industrial Stocks.....	1205
Scandinavian and Russian Trade Service.....	1205
Machinists' Strikes in New York and New Jersey.....	1205
Becker Milling Machine Company Sold.....	1205
Record Exports of Locomotives.....	1205
Machinery Markets and News of the Works.....	1206
New Trade Publications	1214

Durability of Stainless Steel

The way in which stainless steel has stood the test of use for more than two years has dispelled doubts as to its real and permanent value, says the *London Ironmonger*. The only criticism heard is that the cutting capacity, as in knives, is inferior to that of ordinary steel. Knives which have been in daily use for 16 to 18 months retain a surface as brilliant as when they left the polisher's hands although they have never been rubbed or cleaned by polishes. Prices of stainless cutlery have been advanced 15 or 20 per cent because of the advances in steel. The new steel, a chromium alloy steel, is not only expensive but it is costly to work up. The saving, however, is very considerable.

Preparation for Export Trade with Russia

Methods by Which the Manufacturers of the United States Can Secure a Permanent Footing After the War

BY STERLING H. BUNNELL*

The time is certain to come when the United States must again meet foreign competition for the markets of the world. Whenever the close of the war releases the thousands of men from the battle lines and the other thousands of munition makers at home, the present lines of flow of manufactured goods out of the United States and of gold and securities into the United States will be disturbed by opposing currents. Many far-seeing manufacturers are therefore studying the possibilities of developing an export business which can continue after the close of the war.

Of the trade rivals of America, Germany has been the most conspicuously efficient manufacturing nation, and will resume her place as a formidable competitor for foreign markets. France has always supplied most of her own wants in manufactured goods, but will probably be a heavy purchaser of machinery and metals for some time to come. England will continue to make and ship to all the world, buying raw materials only. One nation, however, will emerge from the struggle with tastes educated and needs developed, and with resources at hand to satisfy them. Russia will be a buyer of goods in enormous quantities, and will, therefore, offer the greatest opportunity of all for developing a profitable and enduring export trade. The chance of selling to Russia will be eagerly taken up by every exporting nation, so that if American manufacturers are to have a share of the business they must prepare in advance to withstand the competition which is sure to come.

GERMANY'S MONOPOLY

Before the war Germany held a practical monopoly of Russian trade. Since commercial relations between the two nations have been broken off it is probable that sentiment will operate to hinder their resumption after peace is declared. Sentiment will operate in favor of the allied nations rather than in favor of the United States, so that American-Russian trade can be developed only by successfully competing for it. This means that the American goods offered must be the best adapted to Russian tastes and desires, cheapest in price at destination, with all freight, insurance, duty and exchange included, and most attractively offered to the buyer so as to command his choice against the offerings of his French and English friends.

The Germans monopolized the Russian trade before the war because they went after it, as they did after everything else they wanted. While an occasional American house worked through an export agent in New York, who took an order now and then by mail, the Germans sent personal representatives into Russia to learn the language, establish themselves as Russian residents the year round, and find and offer anything made anywhere in the world which the Russian buyer might want. The German commercial representatives sold German goods when possible, and when they found opportunities for the sale of goods not made in Germany they saw to it that their own name plates were at-

tached. It was then but a step to obliterating the maker's name on the next consignment, and another step to duplicating the goods in German shops when a profitable trade became certain. Many American-made machines are in use to-day in Russia, but they bear only the names of German manufacturers, so that their advertising value to the original makers is lost. The German trading house, however, was then put in position to secure the repeat orders.

Obviously, sale through middlemen using such methods should be avoided by every manufacturer who wants to develop an enduring trade in a foreign country. The manufacturer should always insist on the preservation of his trade name and trademarks on every article of his production where markings are in any way possible. A sales agency will, of course, develop a reputation of its own, and will derive credit from the sale of desirable or popular articles, but the sales agent should not be allowed to substitute his name for that of the manufacturer.

DIRECT AMERICAN REPRESENTATION

Since the personal representative was successfully employed in establishing the German trade in Russia, it is natural to inquire whether the American manufacturer will not get better results by sending his own salesman to Russia than by working through any intermediary. The answer to the query is found by considering the wide gap between the American factory and the Russian buyer. In domestic trade, the salesman forms a link in a very short chain of distribution. He follows the advertising, and closes the sale, and refers it to the credit department, which must accept or modify the terms. In export trade across the ocean, the chain is very much longer, while the trained salesman is still only one link. The German export representative had the advantage of special education for trade and practical training in the foreign language. Such training is only just beginning to be obtainable in the United States. In trade with Russia, English is of very little use, so that the business must be conducted by Russians. All the advertising and catalog description must be in the Russian language. The articles sold must be adapted to Russian use. The goods must be packed for export and invoiced or manifested in accordance with Russian customs requirements. The details of ocean shipment are not as simple as for railroad shipment, and include engaging suitable ship space from among those available, insurance against marine risks, and clearance through customs at the port of destination. There is also a final transportation by rail, or inland water route, to the purchaser. Payment must be made in rubles, usually on long term of credit, with interest; whereas the American manufacturer must receive dollars, cash against shipping documents. The services of a dozen specialists are needed to complete the chain, while the salesman forms one link only.

American-Russian foreign trade must necessarily be in the hands of banking and commercial houses

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adequately organized and financed for the purpose. The success of the houses formerly engaged in the Russian export trade—as has been said, principally Germans—was obtained because they gave complete export service, of which the actual sale was only a very small part. They were organized to sell, purchase, pay for, transport, insure, deliver and collect for the goods, and were in position to extend the service to unlimited lines of manufactured articles. To maintain such complete service is expensive, and can be made profitable only by doing a very large volume of business. On the other hand, the larger the business done the smaller the percentage of expense in handling it, and the wider the scope that may be given to the organization, in local branches, stocks in local warehouses, and advance orders for future requirements.

MORE RUSSIAN THAN AMERICAN

An American-Russian exporting house, in order to be successful, must be more Russian than American. It must have its own shipping departments in both countries; its own banking connections, ready to finance any transaction, no matter how large; its own technical men, of a type broad enough to see both buyers' and makers' sides of every question and work out the proper solution. Its equipment should include the most complete library of manufacturers' catalogs it is possible to get together, and these must be duplicated in every foreign branch. It must have translators and correspondents capable of putting any technicality of Russian or English into the other language and of producing copy for catalogs, advertisements, and business letters, which shall be idiomatically correct. All this obviously requires an organization of many specialists as well as large resources, available to take advantage of any trade possibility whereby the interests of buyer or manufacturer can be promoted.

With such an organization in operation on both sides of the world, the possibilities are unlimited for developing a successful export business. The Russian empire is enormous in area and lacking in railroad facilities. A single agency in New York would not be considered adequate to developing a business throughout the United States; much less can a single office in Moscow or Petrograd be capable of covering the Russian empire. Sales efforts must be extended by river and canal to the many locally important towns not located on railroads. Pictures and films must be used to tell the story to buyers who cannot read, or know nothing of foreign methods. Russian representatives must travel, and make the acquaintance of the local buyers, and prepare the way for the technical men who will select the proper machines for shop work, plan the details of power developments, or estimate the cost of new projects to be undertaken by local capital. The habits and customs of Russians in their undertaking of new work must be understood and conformed to in every particular if the greatest results are to be secured by the organization.

Through the work of such a trading corporation manufacturers can ascertain the patterns, weights and details of articles in use in Russia and the probabilities of successfully introducing improvements or new lines. Careful study should be given to a decision between taking a certain small profit by supplying identical goods and running the chance of getting a greater profit by introducing something different. Much knowledge is necessary in preparing descriptive matter. In this country, most buyers are already familiar with the uses of

the articles to be sold, and are interested in details of materials and workmanship, but the Russian may need to be informed minutely regarding the use of the article and will probably care little about the construction if it does the work. Catalogs must usually be rewritten from beginning to end to get the story over effectively. For the same reason new illustrations must be required. Export business is not unlike mail-order business in the character of descriptive matter necessary, and much may be learned by examining the methods used in catalogs of large houses whose sales are made from the printed page only.

THE MANUFACTURER'S CO-OPERATION

It is not to be assumed that the extensive work done by the export trading corporation can provide the manufacturer with a market without active co-operation on his part. Technical salesmen are necessary in most lines, and the skilled sales specialist must be paid out of the profits of the business, whether he is employed by manufacturer or exporting concern. The salesman, however, can do little by himself; he needs the backing of the exporting house to carry the burden of the details which would otherwise absorb all of his time to the exclusion of his proper work. The detail of the division of the selling cost and the selling responsibilities between manufacturer and exporter should be worked out to suit the actual conditions. It will generally be found that the manufacturer should leave the first investigation and first few sales to the trading house, and while the business begins to come in train one or more salesmen to take places in the export organization later and devote their entire time to expanding the business already established in a small but sure way.

The close of the present war is going to be followed by a period of rapid development of Russian resources. The work to be done in that great empire is unbelievably enormous. It remains only to be seen whether manufacturers in the United States are awake to the opportunity to the extent that they will co-operate with the agencies which are being provided for bringing together the manufacturers in America and the purchasers in Russia who need their products.

An Italian Magnesite Deposit

A magnesite deposit of over 1,000,000 tons in Italy is referred to in a report of the government inspector made to the Association of Italian Metallurgical Works. The mine is now being worked by the Livorno Magnesite Company at Castiglioncello. The content of magnesium carbonate ranges from 88.11 per cent to 90.03 per cent, the silica averaging 2.06 per cent to 3.40 per cent and the oxide of iron 1.60 per cent to 2.30 per cent. The lime content is 2.68 per cent to 3.34 per cent. Bricks are being made from this product by a firm at Vado, Italy, which used magnesite from Greece and Styria before the war. This company is reported able to supply Italy's demand for such brick if the raw material is available. Other deposits reported in Italy are under investigation.

Russia's Railroad Needs After the War

Russia after the war will need to build not less than 7000 miles per year of railroads, requiring about 1,600,000 tons of rails and fastenings, or approximately 800,000 tons more than all existing Russian steel works are able to manufacture in a year. This is a conservative estimate based on a paper by I. Korzhin in the *Commercial and Industrial Gazette*, a Russian journal. A victorious Russia, he states, cannot rest content with 1.2 kilometers of railroad to 100 sq. kilometers of surface, when in western Europe the ratio is 6.7 to 11.8 kilometers to the hundred.

Iron and Steel Markets

LAKE ORE ADVANCE \$1.30

Prices for 1917 Established by Sales

Pig-Iron Market Active and Soaring—More Price Advances in Finished Steel

Many of the large reservations of Lake Superior iron ore for shipment in 1917 which have been going on the books of Cleveland ore firms for weeks virtually became contracts on Wednesday of this week on the announcement that some sales had been made at Pittsburgh at an advance of \$1.30 a ton over this year's prices. This would put old-range Bessemer ores at \$5.75 at lower Lake port, and Mesaba Bessemer at \$5.50. The new non-Bessemer ore prices would thus be \$5 for old-range and \$4.85 for Mesaba.

For some time it has been urged by ore interests that if vessel charters went 50c. above the 1916 rate, the ore advance should be more than \$1. In the past week the vessel rate has been established at \$1.10, including unloading charge, or \$1 net, which is the expected 50c. increase. With their higher labor, fuel and supplies, the ore companies figure an 80c. increase in their cost and consider that an added 50c. a ton would be but a fair share in the prosperity of pig iron and steel interests, making the total \$1.30. At the same time some sellers have been disposed to hold for an advance of \$1.50, particularly on Bessemer ores.

Bessemer ores have been rapidly taken up for next year, in view of heavy foreign buying of lower phosphorus pig irons, and some producers have little to offer. Estimates of next year's ore movement run from 65,000,000 to 67,000,000 tons. Apart from labor and fuel shortage, which will prevent pig-iron output from rising far above the present rate, there is the fact that Lake Superior stockpiles contributed largely to this year's shipments and that all next year's output must be newly mined.

The pig iron market has had another week of heavy buying and of rapidly mounting prices, foundry irons scoring the largest advances. Buyers are moved, not by an existing scarcity, and there is none of the excited buying for quick delivery that has marked all other rapid upturns. Fear of a scarcity next year is the impelling influence.

Alabama furnaces have sold most of their output for the first half and this week's transactions South as well as North have been chiefly for the second half. Some foundries are buying for that delivery without having their output under contract. Others will not buy in advance of sales of castings.

There has been a wide spread in prices in the week's heavy trading. Southern No. 2 foundry sold at \$19 at furnace early last week and to-day the range is \$21 to \$23, near-by and first half deliveries bringing the highest prices. For Virginia iron prices run from \$24 to \$26. In eastern Pennsylvania \$26 and \$27 are named on No. 2 foundry for second half delivery, and Buffalo and Central Western furnaces have advanced to \$27 for the second half, with earlier deliveries at \$28.

In steel making irons the advance has been less

spectacular. In the St. Louis district sales of 50,000 tons of Southern basic to steel foundry interests were made at \$20, Birmingham, for delivery in the second half. Basic iron at Valley furnace has gone to \$25.50 and \$26, and Bessemer iron to \$30, which is \$1 advance in the week.

The general advance of 10 per cent in wages by the Steel Corporation, effective Dec. 15, was not expected until the first of the year, but it is in line with the drift at all iron and steel operations throughout the country. Some of the independent steel companies have already announced a similar advance effective in December.

No end is in sight to the advances in finished steel products. The world's demand for American steel is assuming larger proportions and is more insistent, and domestic consumers are paying prices that will hold the steel at home. Just now the British inquiry for 118,000 tons of rails for 1917, that of Russia for 33,000 tons of rails and a total of 100,000 tons of ship plates for foreign yards are outstanding items in the foreign demand. As high as \$60 a ton has been asked for export rails and on some of the ship plates 6c. was quoted.

Norway has been trying to place four vessels at Pacific coast yards. Lake shipyards are inquiring for 12,000 tons of vessel plates and have been asked 4.50c. for hull plates and 10.40c. for marine steel.

At Pittsburgh the largest producer advanced contract plates this week \$5 a ton or to 3.50c., and bars and shapes \$4 a ton, or to 2.90c. and 3c. respectively. Bolts and nuts are up 5 to 7½ per cent and rivets \$3 a ton.

Billets and sheet bars are now at a minimum of \$55 for early shipment. An inquiry for 60,000 tons of sheet bars for an Eastern sheet and tin plate plant is before Central Western mills. Forging billets have sold as high as \$78.

At Chicago out of 165,000 tons of rails for which Western roads have asked for 1918 about 50,000 tons has been placed at the \$5 advance announced last week.

The Bridge Builders' and Structural Society reports a 77 per cent booking in October, or about 132,000 tons, the best month since May. The building trade is evidently getting used to the higher altitudes in prices.

Pittsburgh

PITTSBURGH, PA., Nov. 22, 1916.

Leading Lake Superior ore producers have named prices for the 1917 season, making a straight advance of \$1.30 per ton on all grades. Their price on old range Bessemer ore for 1917 is \$5.75; Mesaba Bessemer, \$5.50; old range non-Bessemer, \$5; Mesaba non-Bessemer, \$4.85, per gross ton at lower Lake docks. The price for charters for 1917, as fixed by recent transactions, is \$1.10 per gross ton, this including 10c. for unloading at lower Lake docks. The price of hauling coal up the Lakes for next season has been established in the same way at 60c. per net ton. These advances in ore mean a much higher cost of making pig iron. Most furnaces probably have enough ore to run up to June or July, so that the increased cost of making pig iron will not be effective until then. There is apparently no end to the advances in prices. During the week Bessemer pig iron

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Nov. 22, 1916.	Nov. 15, 1916.	Oct. 25, 1916.	Nov. 24, 1915.
No. 2 X, Philadelphia...	\$25.50	\$25.00	\$21.00	\$17.75
No. 2, Valley furnace...	26.00	25.00	21.00	16.00
No. 2 Southern, Cin'ti...	23.00	22.90	18.90	16.40
No. 2, Birmingham, Ala.	21.00	20.00	16.00	13.50
No. 2, furnace, Chicago*	27.00	26.00	22.00	17.50
Basic, del'd, eastern Pa.	26.00	26.00	21.50	17.50
Basic, Valley furnace...	25.50	25.00	20.00	16.00
Bessemer, Pittsburgh...	30.95	29.95	24.95	17.95
Malleable Bess., Ch'go*	27.00	26.00	21.50	17.50
Gray forge, Pittsburgh...	26.95	25.95	20.95	16.45
L. S. charcoal, Chicago...	26.75	25.75	20.25	17.25

Rails, Billets, etc., Per Gross Ton:

Bess. rails, heavy, at mill	38.00	38.00	33.00	28.00
O.-h. rails, heavy, at mill	40.00	40.00	35.00	30.00
Bess. billets, Pittsburgh...	52.50	52.50	50.00	28.00
O.-h. billets, Pittsburgh...	52.50	52.50	50.00	29.00
O.-h. sheet bars, P'gh...	52.50	52.50	50.00	29.00
Forging billets, base, P'gh	78.00	76.50	73.00	50.00
O.-h. billets, Phila...	55.00	55.00	50.00	35.00
Wire rods, Pittsburgh...	65.00	65.00	55.00	38.00

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Iron bars, Philadelphia...	2.659	2.659	2.659	1.859
Iron bars, Pittsburgh...	2.90	2.85	2.75	1.65
Iron bars, Chicago...	2.65	2.65	2.35	1.60
Steel bars, Pittsburgh...	2.90	2.75	2.75	1.70
Steel bars, New York...	3.000	2.919	2.919	1.869
Tank plates, Pittsburgh...	4.25	4.25	4.00	1.90
Tank plates, New York...	4.419	4.419	4.169	2.169
Beams, etc., Pittsburgh...	3.00	2.80	2.75	1.70
Beams, etc., New York...	3.019	2.969	2.869	1.869
Skelp, grooved steel, P'gh	2.85	2.70	2.50	1.70
Skelp, sheared steel, P'gh	3.00	2.80	2.60	1.80
Steel hoops, Pittsburgh...	3.25	3.10	3.00	1.75

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

went up \$1 a ton, to \$30 at Valley furnace; basic, 50c. a ton, to \$25.50 at furnace; No. 2 foundry, \$1, or to \$26 at furnace. The Carnegie Steel Company advanced its price on plates \$5 per ton and on steel shapes and steel bars \$4 per ton, but is practically out of the market for 1917 delivery. Much higher prices are likely on wire rods, and several negotiations are on for rods for foreign delivery, which are expected to bring \$75 at maker's mill. Nuts and bolts were advanced late last week about \$5 per ton and rivets \$3 per ton. The only decline in the market was on prompt coke, which went off about \$1 per ton, with sales of high-grade furnace coke for spot shipment as low as \$6.50 to \$7 per net ton at oven. Tin plate promises to be at least \$1 to \$2 per base box higher for second half delivery, one leading maker predicting that the price will not be less than \$8 per base box. New car orders are plentiful, and two of the leading steel car companies are reported to be well sold up to the latter part of next year.

Pig Iron.—Inquiries are in this market for 60,000 tons or more of Bessemer for shipment to Italy and France, mostly for Italy. As high as \$34, seaboard, has been offered. As the freight rate from Pittsburgh and the Valley districts is \$2.42, the iron would net Valley furnaces \$31.58. It is not likely, however, that any of this iron will come from the Valley furnaces, as they are all oversold on both Bessemer and basic. Since Wednesday and Thursday of last week, there have been sales of 20,000 tons or more of Bessemer to domestic consumers at \$30, Valley furnace, and most sellers now quote \$30.50 and \$31. One sale of 600 tons to a Sharon consumer is reported at \$31 at maker's furnace. New inquiry for basic iron is heavy, and late last week several sales were made at \$25.50, Valley furnace, while the chances are that before next week several sales now pending will be closed at \$26 or higher. Inquiries are in the market for 60,000 to 70,000 tons of basic, one leading consumer wanting 30,000 to 40,000 tons. There is a fairly heavy demand for foundry iron, nearly all for delivery in first quarter and first half of 1917, and prices are strong. Some sales of No. 2 have been made at \$26, Valley furnace, and several makers are now trying to get \$27. We quote: Standard Bessemer iron, \$30; basic, \$25.50; malleable

Sheets, Nails and Wire,	Nov. 22, 1916.	Nov. 15, 1916.	Oct. 25, 1916.	Nov. 24, 1915.
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	3.65	3.65	3.40	2.40
Sheets, galv., No. 28, P'gh	5.25	5.25	4.75	4.25
Wire nails, Pittsburgh...	2.85	2.85	2.70	1.90
Cut nails, Pittsburgh...	2.80	2.80	2.70	1.85
Fence wire, base, P'gh...	2.80	2.80	2.65	1.75
Barb wire, galv., P'gh...	3.70	3.70	3.55	2.75

Old Material, Per Gross Ton

Iron rails, Chicago...	\$25.00	\$25.00	\$22.00	\$16.00
Iron rails, Philadelphia...	24.00	23.00	21.00	17.50
Carwheels, Chicago...	18.00	16.50	14.50	14.50
Carwheels, Philadelphia...	19.00	18.00	16.00	14.00
Heavy steel scrap, P'gh...	21.00	21.00	19.00	17.00
Heavy steel scrap, Phila...	21.00	19.50	16.00	14.75
Heavy steel scrap, Ch'go...	21.00	20.50	17.75	15.00
No. 1 cast, Pittsburgh...	17.00	17.00	16.00	14.00
No. 1 cast, Philadelphia...	19.00	18.00	16.00	14.50
No. 1 cast, Ch'go (net ton)	16.00	15.50	14.75	13.00
No. 1 RR wrot, Phila...	24.50	23.50	22.50	17.00
No. 1 RR wrot, Ch'go (net)	22.00	21.00	18.00	14.00

Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt...	\$6.50	\$7.50	\$7.00	\$2.10
Furnace coke, future...	3.75	3.75	3.75	2.35
Foundry coke, prompt...	7.00	7.00	5.00	2.75
Foundry coke, future...	5.00	5.00	4.50	3.00

Metals,

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York...	34.00	32.50	28.50	19.87½
Electrolytic copper, N. Y.	34.00	32.50	28.50	19.87½
Spelter, St. Louis...	12.25	11.25	10.00	18.75
Spelter, New York...	12.50	11.50	10.25	19.00
Lead, St. Louis...	7.00	6.90	6.92½	5.17½
Lead, New York...	7.15	7.00	7.00	5.25
Tin, New York...	45.12½	44.12½	41.25	39.25
Antimony (Asiatic), N. Y.	14.00	13.00	13.00	39.50
Tin plate, 100-lb. box, P'gh	\$6.00	\$6.00	\$5.75	\$3.40

Bessemer, \$28; No. 2 foundry, \$26 to \$27, and gray forge \$26, all at Valley furnace, the freight rate for delivery in the Pittsburgh and Cleveland districts being 95c. per ton.

Ferroalloys.—The new inquiry for ferromanganese for first quarter and first half delivery is more active, and some quite large sales have been closed. One leading consumer has bought 600 tons of domestic ferromanganese, 100 tons a month, for delivery through the first half, at about \$160 per gross ton at furnace. A sale of 200 tons of English 80 per cent for the same delivery is reported at \$162, seaboard. We quote 80 per cent English at \$162 to \$164, seaboard, and 80 per cent domestic at \$160 to \$162 at furnace, freight added to point of delivery. We quote 18 to 22 per cent spiegel-eisen at \$50 to \$55, and 25 to 30 per cent at \$65 to \$75, delivered. We quote 50 per cent ferrosilicon for delivery next year in lots up to 100 tons at \$100; 100 tons to 600 tons, \$99, and over 600 tons, \$98, all per gross ton, f.o.b. Pittsburgh. We quote 9 per cent at \$32; 10 per cent, \$33; 11 per cent, \$34; 12 per cent, \$35; 13 per cent, \$36.50; 14 per cent, \$38.50; 15 per cent, \$40.50, and 16 per cent, \$43. We quote 7 per cent silvery at \$26.50; 8 per cent, \$27; 9 per cent, \$27.50; 10 per cent, \$28; 11 per cent, \$29, and 12 per cent, \$30. These prices are f.o.b. furnace, Jackson or New Straitsville, Ohio, and Ashland, Ky., all of which have a freight rate of \$2 per gross ton to the Pittsburgh district.

Billets and Sheet Bars.—The assurance is stronger that it would be impossible to buy any soft Bessemer or open-hearth billets or sheet bars for reasonably early shipment at less than \$55 per ton, f.o.b. maker's mill. In fact, small sales of both billets and sheet bars are reported to have been made as high as \$57. The Bethlehem Steel Company is reported to be inquiring in this market for 60,000 tons of sheet bars for delivery to its Baltimore Sheet & Tin Plate Company, but it is doubtful whether any such quantity can be secured in this district as the obligations of local mills are so heavy. Sales of 300 to 400 tons of forging billets were made the past week at \$78, Pittsburgh. We quote base sizes and base carbons of Bessemer and open-hearth billets and sheet bars at \$52.50 to \$57.50 at maker's mill, Pittsburgh or Youngs-

town. We quote forging billets at \$78 for sizes up to, but not including, 10 x 10 in., and for carbons up to 0.25.

Plates.—Good orders for cars were placed the past week, and the new inquiry is very heavy. The Burlington ordered 1000 steel gondolas from the Pressed Steel Car Company, and 2000 box cars from the Haskell & Barker Car Company. The Erie has placed 1000 steel underframe, steel superstructure box cars with the American Car & Foundry Company. Inquiries include 1000 steel hoppers for the Delaware, Lackawanna & Western; 2000 steel gondolas for the Illinois Central; 2000 box cars for the Chicago, Rock Island & Pacific; 1000 stock cars for the Missouri, Kansas & Texas; 500 refrigerator cars, 1000 box cars, 500 automobile cars and 500 stock cars for the Great Northern, 1000 box cars and 500 automobile cars for the Northern Pacific, and 500 steel hoppers for the Nickel Plate. On Monday, Nov. 20, the Carnegie Steel Company advanced its price on sheared tank plates to 3.50c., or \$5 per ton, but with no promise whatever as to deliveries; in fact, that company is practically sold out on plates of all kinds for all of 1917. Other mills are now quoting for delivery in second and third quarters from 4c. to 4.50c. at mill. For delivery in first quarter, prices range from 5c. at mill to as high as 5.50c. Last week a leading mill took an order for 6000 tons of sheared tank plates for shipment to Japan, 1000 tons per month, January to June, at 4c. at mill. We therefore quote sheared tank plates at 3.50c., with no promise of delivery; 4c. to 4.50c. for second to third quarters, and from 5c. to 5.50c. for delivery over the next three or four months, all these prices being f.o.b. at mill, Pittsburgh.

Structural Material.—Effective Monday, Nov. 20, the Carnegie Steel Company advanced its price on structural shapes from 2.80c. to 3c. at mill, or \$4 per ton, but with no promise of delivery. The Jones & Laughlin Steel Company is quoting 3c. and up to 3.25c. for such deliveries as it can make, which would be in second or third quarters of next year. The American Bridge Company has taken 750 tons of steel shapes for extensions to the building of the Saxon Motor Car Company, 750 tons for an extension to the heating plant of the Detroit-Edison Company, Detroit, Mich., and 1000 tons for extensions to hot mill buildings at the Shenango works of the American Sheet & Tin Plate Company, New Castle, Pa. The McClintic-Marshall Company has taken 1000 tons for an addition to the plant of the Joseph Dixon Crucible Company, Jersey City, N. J. The railroads are buying structural steel quite freely for bridges and other work. The Pennsylvania Railroad placed 2500 to 3000 tons last week, divided among three independent shops. We now quote beams and channels up to 15-in. at 3c. at mill, with no promise of delivery, and from 3c. to 3.25c. for second and third quarter shipment in 1917. Prices from warehouse are higher, and we quote small lots from stock from 3.50c. to 3.75c., Pittsburgh.

Steel Rails.—As yet, local makers do not report any sales of standard sections at the new prices named Nov. 15. Nearly all railroads have covered their entire needs of rails for 1917 delivery. The new demand for light rails is quite active from the coal-mining interests, but from the traction companies and the lumber interests is quiet. Prices on light rails have not been advanced, but are firm. Some of the makers of frogs and switches have not covered on their needs of rails of next year, and will likely have to look to the railroads that place orders with them for frogs and switches for at least a part of their supply of rails. We quote 25 to 45 lb. sections at \$47; 16 and 20 lb., \$48; 12 and 14 lb., \$49; and 8 and 10 lb., \$50, in carload lots, f.o.b. at mill, the usual extras being charged for less than carload lots. We quote standard section rails of Bessemer stock at \$38, and of open-hearth \$40, per gross ton, Pittsburgh.

Sheets.—The very heavy demand for all grades of sheets that has been a feature of the market for the past month or more continues, and a decided shortage in the supply of blue annealed, Bessemer black, and galvanized sheets already exists. In fact, several mills

have about adopted the plan of allotting their output, and are restricting sales by their agents to the amount set aside for them. The shortage in sheet bars is keeping down the output to some extent, but the great trouble is to get cars and to get them moved after they have been loaded. Shipments are badly delayed on this account, and there have been cases where loaded cars that ordinarily should reach destination in two or three days have been from ten days to three weeks on the road. The shortage in supply of galvanized sheets is greater than in the other grades, and prices seem certain to be higher. Minimum prices now ruling on sheets in carloads and larger lots are as follows: Blue annealed sheets, Nos. 3 to 8, 3.50c. to 3.60c.; box annealed, one-pass, cold-rolled sheets, No. 28, 3.65c. to 3.75c.; No. 28 galvanized, 5.25c. to 5.50c., and No. 28 tin-mill black plate, 3.60c. to 3.65c., all f.o.b. Pittsburgh.

Tin Plate.—Nearly all consumers have covered their needs for the first half of 1917, and some have bought practically their entire requirements for the second half, on which the price is left open. It is stated that some contracts taken for delivery in the first half will probably run over into July or August next year, several mills having sold probably more than they can turn out in the first half. The export demand is heavy, and it is said as high as \$7.50 per base box can be obtained by mills that are in position to quote and make the deliveries wanted. Two or three mills that recently increased their capacity to a large extent are about the only ones that are in position to take on any export business. Prices on current small orders have gone up, and primes and wasters from stock are being quoted from \$6.50 to \$7 per base box at mill. We quote bright plate, 14 x 20, at \$6 to \$6.25 per base box, f.o.b. Pittsburgh, on contract for delivery in the first half of 1917, and small lots of primes and wasters from stock at \$6.50 to \$7 per base box at mill.

Shafting.—Better deliveries of shafting are being made by several mills that have caught up on back orders to some extent. Nearly all large consumers are covered for the first quarter and some for the first half. On small current orders from 5 to 10 per cent off list is being quoted. We quote cold-rolled shafting at 20 to 15 per cent off in carload lots and 10 per cent off in less than carload lots for first quarter and first half of 1917, f.o.b. Pittsburgh, freight added to point of delivery.

Wire Products.—For some time the American Steel & Wire Company has not been accepting contracts on either nails or wire, confining sales to specified orders, and another leading interest is now taking contracts only for one month. Several of the larger wire and wire nail makers have called their men off the road, quoting only to regular customers, and requiring sales offices to submit inquiries to the home office before any obligations are made. The domestic demand continues heavy and the export demand is also quite active. Several leading mills are quoting \$3 on wire nails for delivery in the first half of 1917, but to regular customers only. The market on wire nails is fast getting to the \$3 basis, and it is believed that not later than Dec. 1 regular prices will be on that basis. Prices now in effect are as follows: Wire nails \$2.85, base, per keg; galvanized, 1 in. and longer, including large head barbed roofing nails, taking an advance over this price of \$2, and shorter than 1 in., \$2.50. Bright basic wire is \$2.90 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$2.80; galvanized wire, \$3.50; galvanized barb wire and fence staples, \$3.70; painted barb wire, \$3; polished fence staples, \$3; cement-coated nails, \$2.75, base, these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven wire fencing are 55 per cent off list for carload lots, 54 per cent for 1000-rod lots and 53 per cent for small lots, f.o.b. Pittsburgh.

Railroad Spikes and Track Bolts.—The new demand for spikes is more active. Some makers are declining to sell at 2.65c., stating that the price is too low in view of the fact that steel bars are 2.90c., minimum, and it costs more to make spikes. One maker is quoting 2.75c., but as yet there has been no general advance. Prices on track bolts are firm and likely to be higher.

We quote track bolts with square nuts at 4.50c. to 4.75c. to railroads and 5c. to 5.25c. in small lots to jobbers, base. Track bolts with hexagon nuts take the usual advance of 15c. per 100 lb. Prices on spikes are as follows:

Standard railroad spikes, $4\frac{1}{2}$ x $9\frac{1}{16}$ in. and larger, \$2.65 to \$2.75; railroad spikes, $\frac{1}{2}$ to $7\frac{1}{16}$ in., \$2.75 base; railroad spikes, $\frac{3}{4}$ in. and $5\frac{1}{16}$ in., \$3.05 base; boat spikes, \$2.80 base, all per 100 lb., f.o.b. Pittsburgh.

Wire Rods.—Practically any price can be obtained that the mills care to ask if they can make the deliveries. A foreign inquiry is in this market, and it is not improbable that the business will be placed in a day or two on the basis of \$75 per ton at mill for soft rods. The demand from Canada is heavy, and regular shipments are being made to that country. Domestic consumers that have not covered for the first quarter and first half of next year may have to pay prohibitive prices where their product enters into competition with mills that make their own rods. We quote soft Bessemer, open-hearth and chain rods at \$65 to \$70 per gross ton, f.o.b. Pittsburgh, and the higher price could likely be obtained if any mill has rods to spare for the shipments wanted.

Iron and Steel Bars.—Effective Monday, Nov. 20, the Carnegie Steel Company raised its price on steel bars from 2.70c. to 2.90c. at mill, an advance of \$4 per ton. None of the other makers of steel bars is quoting less than 2.90c., and some are quoting 3c. to 3.25c., prices depending on quantities and deliveries. The Carnegie Company is practically sold up on steel bars for all of 1917, and other makers that can promise deliveries in the second and third quarters are not quoting, as a rule, less than 3c. The new demand for steel bars for reinforcing purposes is heavy, and prices are higher. Mills rolling iron bars also report the demand heavy, and prices are up fully \$1 per ton. We quote merchant steel bars at 2.90c. at mill, with no promise as to delivery, and from 3c. to 3.25c. for delivery in the second and third quarters of 1917. We quote refined iron bars at 2.90c. to 3c., and railroad test bars 3c. to 3.10c., f.o.b. Pittsburgh.

Hoops and Bands.—The nominal price of the Carnegie Steel Company on steel bands is now 2.90c., with extras as per the steel-bar card, and on hoops 3.25c., but with no promises as to delivery. Other makers that can ship in the second or third quarters of 1917 are quoting steel bands from 3c. to 3.25c. and steel hoops 3.25c. to 3.50c. at mill.

Nuts and Bolts.—Late last week an advance of 5 per cent, or about \$5 per ton, was made in prices of nuts and bolts. The steadily advancing prices of steel bars, the scarcity of labor, which is greatly reducing output, and the abnormal demand are the main reasons given for the advance. Makers state that they are getting further behind in deliveries, as it is impossible to keep their working forces up to the standard. The export demand is heavy, but not much attention is being given to this, as makers prefer to conserve their output for domestic consumers. The new discounts are as follows, delivered in lots of 300 lb. or more where the actual freight rate does not exceed 20c. per 100 lb.; terms 30 days net or 1 per cent for cash in 10 days:

Carriage bolts, small, rolled thread, 50 per cent; small, cut thread, 40 and $7\frac{1}{2}$ per cent; large, 35 per cent.

Machine bolts, h. p. nuts, small, rolled thread, 50 and 5 per cent; small, cut thread, 40, 10 and 5 per cent; large, 40 per cent.

Machine bolts, c. p. c. and t. nuts, small, 40 and 5 per cent; large, 30 and 5 per cent. Bolt ends, h. p. nuts, 40 per cent; with c. p. nuts, 30 and 5 per cent. Lag screws (cone or gimlet point), 50 per cent.

Nuts, h. p. sq. and hex., blank, \$2.60 off list, and tapped, \$2.40 off; nuts, c. p. c. and t. sq., blank, \$2.20 off, and tapped \$2 off; hex., blank, \$2.50 off, and tapped, \$2.25 off. Semi-finished hex. nuts, 60 per cent. Finished and case-hardened nuts, 60 per cent.

Rivets, $7\frac{1}{16}$ in. in diameter and smaller, 45 and 10 per cent.

Rivets.—Due to the same conditions as those in the bolt and nut trade, an advance of \$3 per ton has been made in rivets. It is said that many who formerly worked in rivet shops have gone into other lines in which much higher wages are being paid. The consuming trade is well covered through the first quarter,

and, in some cases, over the first half, and specifications are heavy. Makers' prices are now as follows: Button-head structural rivets, $\frac{1}{2}$ in. in diameter and larger, \$4.15 per 100 lb., base, and conehead boiler rivets, same sizes, \$4.25 per 100 lb., base, f.o.b. Pittsburgh. Terms are 30 days net or one-half of 1 per cent for cash in 10 days.

Cold-Rolled Strip Steel.—Nearly all consumers have covered their needs through the first quarter of 1917, but none of the makers is quoting for delivery beyond that period. The high prices ruling have apparently not had the effect of cutting down consumption to any extent, as the contracts placed for the first quarter are fully as large as were placed at this time a year ago. On current orders for fairly prompt shipment makers quote \$7 for fair-sized quantities up to \$7.50 per 100 lb. for small lots; on contracts for first quarter delivery, \$6.50 to \$7. Terms are 30 days net, less 2 per cent off for cash in 10 days, delivered in quantities of 300 lb. or more when specified for at one time.

Merchant Steel.—Prices are up fully 10 per cent, and some makers will not sell for delivery beyond the first quarter, owing to the uncertainty of future costs of pig iron and labor. In a few cases, to the very largest consumers, some contracts have been placed for delivery through the entire first half of next year. We quote small lots as follows, f.o.b. mill, Pittsburgh: Iron finished tire, $\frac{1}{2}$ x $1\frac{1}{2}$ in. and larger, 2.90c. base; under $\frac{1}{2}$ x $1\frac{1}{2}$ in., 3c. base. Planished tire, 3c. to 3.05c. Smooth channel tire, $\frac{3}{4}$ to $\frac{7}{8}$ and 1 in., 3.10c. to 3.25c.; $1\frac{1}{2}$ in. and larger, 3.25c. Toe calk, 3.40c. to 3.60c. base. Flat sleigh shoe, 2.90c. to 3c.; concave and convex, 3c. to 3.10c. Cutter shoes, tapered or bent, 3.75c. to 4c., depending on specification. Spring steel, 4.15c. to 4.25c. Machinery steel, smooth finish, 3.25c. to 3.40c.

Wrought Pipe.—The advanced prices are not only firmly held, but more advances are looked for before the first of the year. On lap-weld, iron and steel, mills are sold up practically to July 1, 1917, but on butt-weld they can make deliveries in four to six weeks. Several of the larger pipe mills have now entered more orders for tubular products twice over than they took in all of last year. An inquiry is in the market for 20 to 25 miles of 8-in. line pipe for delivery to a West Virginia gas company. It is not likely, however, that many large contracts for line pipe will be placed for a while, as the mills cannot make deliveries before March or April. Discounts now effective on black and galvanized iron and steel pipe are given on another page.

Boiler Tubes.—Local mills making iron and steel boiler tubes are completely sold up for eight or ten months into 1917, and state that consumers are specifying freely against contracts. Premiums are offered over regular prices for early deliveries on either iron or steel tubes. Another advance in prices is looked for before the first of the year. Discounts now in effect are given on another page.

Coke.—Last week there was a decline of \$1 a ton or more in the price of furnace coke for prompt shipment, sales having been made as low as \$6.50 per net ton at oven, and probably lower. Producers and dealers both say the supply of cars is not any better, and labor is still scarce, but the demand for spot coke fell off, and this probably explains the decline. One leading producer claims to have refused \$4 for 10,000 tons of blast-furnace coke per month for the first half and is said to be quoting \$4.50, but the market has not reached that price. Some furnace men who have not covered their coke needs for the first half are not willing to contract at present prices, feeling that the market may be lower. Higher prices are being paid for best makes of foundry coke, both for spot shipment and on contracts. We quote high grade blast-furnace coke for prompt shipment at \$6.50 to \$7 per net ton at oven, and on contracts from \$3.75 to \$4; best grades of 72-hr. foundry coke for spot shipment, \$7.50 to \$8, and on contracts \$5 to \$6. The Connellsville *Courier* gives the output of coke in the upper and lower Connellsville regions for the week ended Nov. 11 as 421,513 net tons, an increase over the previous week of 13,231 tons.

Old Material.—The local market is firm, with all signs pointing to higher prices, but the volume of sales

by dealers to consumers is not heavy. Dealers that have scrap piled in their yards are inclined to hold it for a higher market, one with an exceptionally heavy stock of old rails having decided not to sell any until after Jan. 1, in the belief that prices will then be several dollars a ton higher. There is a fairly heavy demand for low phosphorus melting scrap and for borings and turnings. A sale of 3000 tons of selected heavy steel scrap for delivery in the first four months of 1917 is reported at \$21, delivered to consumers' mills; also a sale of 1000 tons of borings at \$8.50 and 1000 tons of low phosphorus melting stock at \$25, delivered at buyers' mills. Bids which have gone in on the Pennsylvania and Baltimore & Ohio scrap lists are said to be about \$3 a ton higher on most grades of steel scrap than were bid on the previous lists. Prices now being quoted by dealers for delivery in Pittsburgh and points that take the same rates of freight, per gross ton, are as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh, delivered	\$21.00 to \$22.00
No. 1 foundry cast	17.00 to 17.50
Re-rolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	24.50 to 25.00
Hydraulic compressed sheet scrap	16.50 to 17.00
Bundled sheet scrap, sides and ends, f.o.b. consumers' mills, Pittsburgh district	13.50 to 14.00
Bundled sheet stamping scrap	13.00 to 13.50
No. 1 railroad malleable stock	17.50 to 18.00
Railroad grate bars	12.50 to 13.00
Low phosphorus melting stock	24.50 to 25.00
Iron car axles	42.00 to 43.00
Steel car axles	42.00 to 43.00
Locomotive axles, steel	44.00 to 45.00
No. 1 busheling scrap	16.00 to 16.50
Machine-shop turnings	8.50 to 9.00
Old carwheels	16.50 to 17.00
Cast-iron borings	10.00 to 10.50
*Sheet bar crop ends	21.50 to 22.00
No. 1 railroad wrought scrap	21.00 to 22.00
Heavy steel axle turnings	13.00 to 13.50
Heavy breakable cast scrap	15.00 to 15.50

*Shipping point.

Chicago

CHICAGO, ILL., Nov. 22, 1916.—(By Wire.)

Western railroads are being given the opportunity to cover for 1918 rails at the new prices of \$38 and \$40, and approximately 165,000 tons is under negotiation, with sales last week amounting to about 50,000 tons. Orders for car steel comprised the bulk of the week's business, which for one interest alone totaled over 135,000 tons. An advance of \$2 per ton has been made on shapes, plates and bars and minimum sheet prices are higher by \$5 to \$8 per ton. Some of the independent interests are now regularly quoting 4c., Pittsburgh, for tank plates for first half. Bolt prices have been raised 5 per cent and rivets \$3 per ton. Out of stock, prices for black and galvanized sheets have been again raised, to a minimum of 4.15c. for black and 5.80c. for galvanized. Prices of pig iron and scrap continue their rapid upward movement, with some limitation of business as a result of high prices and scarcity of materials. At Chicago an award of 18,000 tons of cast-iron pipe has been made.

Pig Iron.—The chief concern of buyers in the past week has had to do with the question of last half iron. Negotiations were inaugurated with the offering of a standard Southern iron at \$19 for last half, \$1 per ton less than the first half price. The furnaces have taken a round tonnage at that price, probably over 50,000 tons, and the price has now been advanced to \$20 for the entire year. This activity has been almost entirely confined to Southern iron, though involving the competitive Northern high-phosphorus iron to some extent. The Northern furnaces are not considering last half sales of standard foundry and malleable irons, in view of the uncertainty regarding the proportion of capacity that will be employed in the manufacture of steel-making irons. There is still inquiry in the market for Bessemer iron in quantity. The furnace situation in the South is also being determined in considerable measure by the number of stacks that have been put on basic and Bessemer iron. For Southern foundry, the price is now definitely at \$20, Birmingham, for sale in Northern

markets, and Northern competitive iron is selling at 50c. to \$1 per ton higher. For other Northern iron \$27 is being quoted. Charcoal-iron prices have been advanced to a minimum of \$26, and producers are requiring that all inquiry be submitted. The amount of iron of all kinds under negotiation is considerable, and buyers desiring to close find themselves under the necessity of moving quickly. For Lake Superior charcoal iron we quote delivery prices at Chicago to include a freight rate of \$1.75. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5	\$26.75 to \$27.75
Lake Superior charcoal, No. 1	27.25 to 28.25
Lake Superior charcoal, No. 6 and Scotch	27.75 to 28.75
Northern coke foundry, No. 1	27.50
Northern coke foundry, No. 2	27.00
Northern coke foundry, No. 3	26.50
Northern high phosphorus foundry	25.00 to 25.50
Southern coke No. 1 f'dry and 1 soft	24.50 to 25.00
Southern coke, No. 2 f'dry and 2 soft	24.00 to 24.50
Malleable Bessemer	27.00
Basic	27.00
Low phosphorus	40.00
Silvery, 8 per cent	35.50 to 36.00
Bessemer ferrosilicon, 10 per cent	40.50 to 42.50

(By Mail)

Rails and Track Supplies.—With the announcement of the advance in the prices of rails to \$38 for Bessemer and \$40 for open hearth, opportunity has been given the Western railroads to cover their needs for 1918. Of about 165,000 tons under negotiation, approximately 50,000 tons were booked last week at the new price, and the situation suggests that buying by other railroads will follow rapidly. Light rail sales have been exceptionally heavy, and prices for these sections have been advanced \$4 per ton. Spike and bolt prices are also higher. Quotations are as follows: Standard railroad spikes, 2.75c. to 2.90c., base; track bolts with square nuts, 4c. to 4.50c., base, all in carload lots, Chicago; tie-plates, \$52 to \$54, f.o.b. mill, net ton; standard section Bessemer rails, Chicago, \$38, base; open hearth, \$40; light rails, 25 to 45 lb., \$44; 16 to 20 lb., \$45; 12 lb., \$46; 8 lb., \$47; angle bars, 2.25c.

Structural Material.—Steel for carbuilding purposes again constituted the bulk of the week's buying, but unless earlier deliveries can be had than are generally understood to be possible, the cars now being ordered will not contribute any relief to the shortage before next summer is well advanced. Better conditions obtain, however, in the matter of deliveries with respect to structural steel than is true of some other products. An advance of \$2 per ton has been announced for shapes, and 2.90c., Pittsburgh, is now the minimum quotation. The Haskell & Barker Car Company took the large orders for cars last week, embracing 500 refrigerator and 500 stock for the Great Northern and 1000 box for the Chicago, Burlington & Quincy. Building contracts reported closed last week involved no large steel requirements. The principal lettings of the week include 2300 tons taken by the American Bridge Company, of which 1200 tons is for a Northern Pacific ore dock, 300 tons for the Great Northern, 200 tons for the Minneapolis & St. Louis, 200 tons for the Illinois Steel Company and 400 tons for the American Can Company. Wendnagel & Co. took a 400-ton building and the Gage Structural Steel Company a 150-ton job. We quote plain structural material, Chicago, from mill, 3.089c.

We quote for Chicago delivery of structural steel from jobbers' stocks 3.35c.

Plates.—The leading interest has advanced its price for plates \$2 per ton to the basis of 3.35c., Pittsburgh, but for current orders, where near-by delivery is desired, quotations continue to range from 3.75c. for narrow plates to 5c. for wide. The larger part of last week's business in plates was made up of car steel, there having been some falling off in the inquiry for ship plates. Orders from tank and boiler shops are generally small and for early delivery. We quote for Chicago delivery of plates from mill at its convenience, 3.539c. For prompt shipment we quote 3.939c. to 4.189c.

in widths up to 72 in., and for wide plates 4.689c to 5c.

We quote for Chicago delivery of plates from jobbers' stocks 4c.

Sheets.—The mills that have sheets to sell are asking from 4c. to 4.25c., Pittsburgh, for No. 28 black, and for blue annealed from 3.50c. to 3.75c. Galvanized sheets are quoted at various prices between 5c. and 6c., f.o.b., Pittsburgh. Sheet makers report that the amount of inquiry they are under necessity of declining to consider is amazing. Few mills have anything to offer for the first quarter, and only a part of the demand for second quarter seems possible of being considered. We quote, for Chicago delivery, blue annealed, No. 16 and heavier, 3.689c. to 3.939c.; box annealed, No. 17 and lighter, 4.189c. to 4.439c.; No. 28 galvanized, 5.689c. to 6c.

Store prices for sheets, we quote for Chicago delivery out of stock, minimum prices applying on bundles of 25 or more, as follows: No. 10 blue annealed, 3.80c.; No. 28 black, 4c. to 4.10c.; No. 28, galvanized, 5.50c. to 5.60c.

Bars.—Aside from the announcement of the advance of \$2 in the price of mild steel bars there is little of interest transpiring in respect to bars. The makers of rail carbon steel and of iron bars are more than comfortably situated, and their conservatism in the consideration of additional business is augmented by the uncertainty surrounding the cost and availability of scrap and fuel. We quote mill shipment, Chicago, as follows: Bar iron, 2.65c.; soft steel bars, 2.989c.; hard steel bars, 2.60c.; shafting, in carloads, 20 per cent off; less than carloads, 15 per cent off.

We quote store prices for Chicago delivery: Soft steel bars, 3.3c.; bar iron 3.35c.; reinforcing bars, 3.35c. base with 5c. extra for twisting in sizes $\frac{1}{2}$ in. and over and usual card extras for smaller sizes; shafting net list.

Rivets and Bolts.—An advance of 5 per cent in the prices of bolts and nuts, announced at the end of last week, was coincident with the placing of specifications for many millions of bolts against contracts at the previously ruling prices. Some of the irregularities in prices appear also to have been cleared up and with the increasing scarcity and cost of bars, rods, fuel and labor, concessions are considered by the trade as much less likely to recur. We quote as follows: Carriage bolts up to $\frac{3}{8}$ x 6 in., rolled thread, 50; cut thread, 40-7 $\frac{1}{2}$; larger sizes, 35; machine bolts up to $\frac{3}{8}$ x 4 in., rolled thread, with hot pressed square nuts, 50-5; cut thread, 40-10-5; large size, 40; gimlet-point coach screws, 50; hot pressed nuts, square, \$2.60 off per 100 lb.; hexagon, \$2.60 off. Structural rivets, $\frac{3}{4}$ to 1 $\frac{1}{4}$ in., 4.15c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

Store prices are as follows: Structural rivets, 4.25c.; boiler rivets, 4.35c.; machine bolts up to $\frac{3}{8}$ x 4 in., 50; larger sizes, 40-5; carriage bolts up to $\frac{3}{8}$ x 6 in., 40-10; larger sizes, 35-5; hot pressed nuts, square, \$3 and hexagon, \$3 off per 100 lb.; lag screws, 50-5.

Cast-Iron Pipe.—The advance in pipe prices of \$3 per ton announced last week was followed two days later by another of \$2 per ton and we have revised our quotations accordingly. At Chicago an award of 15,000 tons has been made to the leading interest at \$35 per ton and of 3300 tons to the American Cast Iron Pipe Company at a slightly lower figure. The United States Cast Iron Pipe & Foundry Company will also furnish 1500 tons for Duluth. St. Paul is in the market for 1250 tons and Bay City, Mich., for 550 tons. We quote as follows, per net ton, Chicago: Water pipe, 4 in., \$40.50; 6 in. and larger, \$37.50, with \$1 extra for Class A water pipe and gas pipe.

Wire Products.—Although the demand for wire nails and plain and barb wire seems to have abated but little, the reason for which is indicated in very complete reports recently received showing stocks in the hands of both jobbers and retailers as much below normal, the withdrawal of sales forces from the field has brought a noticeable decrease in fence sales. We quote as follows per 100 lb.: Plain wire, Nos. 6 to 9, base, \$3.089; wire nails, \$3.039; painted barb wire, \$3.189; galvanized barb wire, \$3.889; polished staples, \$3.189; galvanized staples, \$3.889; all Chicago.

Old Material.—The advances in the prices of scrap in the last week were hardly as radical as those of the

week preceding, although still abnormal. But the quantity of old material coming into the market for sale continues so limited that each small lot of a few cars brings its own price. Of the several small lists of railroad scrap offered last week none exceeded 600 tons. Dealers are finding themselves unable to do business in many instances because of the disproportionate amount of money involved in the handling of scrap and because of the rapid changes in prices. Buyers of old material are for the most part taking all that is offered but are still using up their stocks more rapidly than they can be replenished. The uncertainty of the scrap supply is seriously affecting the question of new material sales in a number of lines. Foundry grades and old carwheels have advanced least rapidly, and some attention is being given to their use as substitutes for other materials. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	\$25.00 to \$26.00
Relaying rails	25.50 to 26.00
Old carwheels	18.00 to 18.50
Old steel rails, rerolling	25.00 to 26.00
Old steel rails, less than 3 ft.	23.50 to 24.00
Heavy melting steel scrap	21.00 to 22.00
Frogs, switches and guards, cut apart	21.50 to 22.00
Shoveling steel	19.00 to 19.50
Steel axle turnings	19.00 to 19.50

Per Net Ton	
Iron angles and splice bars	26.00 to 26.50
Iron arch bars and transoms	25.50 to 26.00
Steel angle bars	19.50 to 20.00
Iron car axles	33.00 to 34.00
Steel car axles	37.50 to 38.00
No. 1 railroad wrought	22.00 to 23.00
No. 2 railroad wrought	21.00 to 22.00
Cut forge	21.00 to 22.00
Pipes and flues	15.00 to 15.50
No. 1 busheling	18.50 to 19.00
No. 2 busheling	12.75 to 13.25
Steel knuckles and couplers	23.50 to 24.50
Steel springs	23.50 to 24.50
No. 1 boilers, cut to sheets and rings	13.50 to 14.00
Boiler punchings	19.50 to 20.00
Locomotive tires, smooth	25.00 to 26.00
Machine-shop turnings	8.00 to 8.50
Cast borings	7.75 to 8.25
No. 1 cast scrap	16.00 to 16.50
Stove plate and light cast scrap	12.25 to 12.75
Grate bars	13.00 to 13.50
Brake shoes	13.00 to 13.50
Railroad malleable	16.50 to 17.00
Agricultural malleable	14.50 to 15.00

Philadelphia

PHILADELPHIA, PA., Nov. 21, 1916.

An interesting event of the past week was the purchase by a Coatesville plate mill of about 20,000 tons of Southern basic pig iron for which it paid \$20, furnace, or \$25.25, delivered, which is 75c. less than the furnace price asked by Northern producers. The latter quote \$26, furnace. Standard low phosphorus is fast approaching the \$50 level, makers now asking \$47 to \$49, delivered, according to analysis. The demand for material low in phosphorus is enormous, and presents a serious situation in view of its restricted production. The demand for plates is greater than ever, and turning business away is a common occurrence. Blue annealed sheets have been advanced. The structural mills in this territory have not contracted heavily into the second quarter of 1917, but they see that a large tonnage specified for the first quarter will extend into the second. Some of the railroads, as well as shipbuilders, are making efforts to reserve rolling capacity for 1918, the former for rails and the latter for plates. The domestic makers of ferromanganese are holding their product more firmly, concessions on prompt deliveries having practically disappeared. Blast-furnace ferro-silicon is becoming scarce. The old material market is active all along the line, and several thousand tons of heavy melting steel has been taken at \$21, delivered.

Pig Iron.—In point of tonnage the greatest activity has been in basic, about 30,000 tons of which was taken by two consumers. A Coatesville plate mill closed for about 20,000 tons of Southern basic, first half delivery, at \$20, furnace, or \$25.25, delivered. At least two eastern Pennsylvania mills quoted \$26, furnace. A central Pennsylvania consumer took 10,000 tons, second quarter delivery, at \$26, furnace, about equal to \$27.25 delivered. In view of their sold-up condition, the unsuccessful Northern bidders are expressing but little

regret over the loss of the business through the deal in Southern basic. Of equal interest is the continued activity in low phosphorus iron and the manner in which it is approaching the \$50 mark. One furnace disposed of 12,000 to 15,000 tons for varied deliveries throughout next year at prices ranging from \$45.75 to \$46.75, delivered, and the makers are now asking \$47 to \$49, according to analysis. Lebanon low phosphorus is quoted about \$2 less. The supply of low phosphorus available for any delivery is almost entirely absorbed, and the situation is regarded as grave by those interested. Important makers of foundry iron are not attempting to maintain any schedule of prices, and in view of the wide range involved in recent transactions it is difficult to place the market. For a couple of 100-ton lots of eastern Pennsylvania No. 2 X, \$27, furnace, or \$27.79, delivered, was paid. For other lots \$26, furnace, was paid. One brand is held at \$26.50, furnace, equal to \$28.40 delivered. The coke problem continues serious, and is having a direct effect on prices. Foundry iron has been fairly active, almost entirely for future delivery, indicating that founders look for a big year in 1917. Several round lots of gray forge have been taken, and inquiry is still unsatisfied. Quotations for this grade range from \$24 to \$25. A local pipe works contracted for a round lot of iron. The leading Virginia maker withdrew from the market when quoting \$24, furnace, or \$26.75, delivered, and while sales are reported at \$25 to \$26, furnace, \$24 would seem to bear about the correct relation to the quotations for eastern Pennsylvania iron. Southern iron would sell here were it possible to obtain deliveries. Quotations for standard brands delivered in buyers' yards, prompt shipment, range about as follows:

Eastern Pa. No. 2 X foundry.....	\$25.50 to \$26.50
Eastern Pa. No. 2 plain.....	25.00 to 26.00
Virginia No. 2 X foundry.....	26.75
Virginia No. 2 plain.....	26.50
Gray forge.....	24.00 to 25.00
Basic.....	26.00 to 27.00
Standard low phosphorus.....	47.00 to 49.00

Iron Ore.—Imports in the week ended Nov. 18 consisted of 4295 tons from Spain and 6900 tons from Chile.

Ferroalloys.—Foreign 80 per cent ferromanganese is unchanged at \$164, first half delivery. Domestic makers have been doing some prompt business under this figure, but their quotations are now stronger at \$165, delivered. The quotation on forward 50 per cent ferrosilicon is pretty well established at \$100, Pittsburgh, for carloads, and \$1 less for 100-ton lots. Small lots for nearby delivery command from \$110 to \$115, Pittsburgh. A sale of 500 tons of 10 to 11 per cent ferrosilicon, last half delivery, was made at \$36, furnace, or \$39.44, delivered, but for prompt up to \$44.44, delivered, is quoted. Blast-furnace ferrosilicon is unquestionably scarce. Spiegeleisen is quoted at \$50, furnace, and is strong.

Plates.—Several hundred tons of tank steel have been purchased at 5c., Pittsburgh, or 5.159c., Philadelphia, for delivery in six months. For flange steel, eight weeks' shipment, 6.15c., Eastern mill, has been paid. An order for 10,000 tons of ship plates, delivery in the last quarter of 1917, at 4.50c., Pittsburgh, was declined, likewise 1300 tons to be shipped in the first quarter of 1917, for which 5c., Pittsburgh, was offered. The minimum quotation in this territory is 4.159c., Philadelphia, with a leading maker quoting 4.909c., Philadelphia, as his bottom price. On marine boiler steel, 10.40c., Pittsburgh, is quoted. The heavy demand for ship plates is without abatement, some of the shipbuilders trying to reserve capacity as far ahead as 1918. Quotations range from 5.159c. to 5.659c., Philadelphia.

Bars.—Makers in this territory quote 3.159c., Philadelphia, as their minimum for steel bars. The market is active. Iron bars are stronger and an advance from 2.659c., Philadelphia, carload lots, is predicted. There is a heavy export inquiry for iron bars.

Billets.—With deliveries in the next few months more difficult than ever to procure, open-hearth re-rolling billets are strong at \$55, with forging steel at \$65 to \$75.

Structural Material.—An eastern Pennsylvania mill continues to quote 3c., Pittsburgh, for Eastern shipment,

and 3c., mill, for Western shipment, this level being its minimum. Another maker is almost out of the market for first half material, but names 3c., Pittsburgh, when it quotes. All of the mills find their bookings for the first quarter will run heavily into the second. In exceptional cases only have they sought second quarter business. Meanwhile inquiry continues heavy, although no important building propositions are mentioned.

Sheets.—No. 10 blue annealed are higher at 3.909c., Philadelphia.

Rails.—For odd lots of steel rails, ranging up to 250 tons, \$50, mill, has been paid, a steel mill which rolls rails being a buyer at that price. Even at this price it is pointed out that steel is much more valuable for other purposes. Several of the railroads are feeling round, in the endeavor to reserve rolling capacity for 1918. It is considered very probable that some of the roads will not receive the 1917 deliveries for which they bargained. The Southern Railway is about to close for 200,000 patent rail joints. The Norfolk & Western and the Chesapeake & Ohio are in the market for spikes.

Coke.—High prices for coke continue to rule, with consumers who are not getting good deliveries on their contracts seeking new sources of supply. For spot furnace \$7 per net ton at oven has been paid, and \$7.50 to \$8 is quoted. Contract furnace is nominal at \$3.75 to \$4. Prompt foundry is held at \$9 to \$10 per net ton at oven, and contract at \$6 to \$7. Freight rates from the principal producing districts are as follows: Connellsville, \$2.05; Latrobe, \$1.85, and Mountain, \$1.65.

Old Material.—The market is strong and active, consumers and not brokers doing the buying. An Eastern mill took about 15,000 tons of heavy melting steel at \$21, delivered. Coatesville is again under embargo. An exporter has offered \$25 for steel to be shipped to Italy. Low phosphorus scrap is none too plentiful and is correspondingly strong. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates from 35c. to \$1.35 per gross ton, are as follows:

No. 1 heavy melting steel.....	\$21.00 to \$21.50
Old steel rails, rerolling.....	24.00 to 25.00
Low phos. heavy melting steel scrap.....	28.00 to 30.00
Old steel axles (for export).....	40.00
Old iron axles (for export).....	40.00
Old iron rails.....	24.00 to 25.00
Old carwheels.....	19.00 to 20.00
No. 1 railroad wrought.....	24.50 to 25.00
Wrought-iron pipe.....	17.50 to 18.00
No. 1 forge fire.....	14.50 to 15.00
Bundled sheets.....	14.50 to 15.00
No. 2 busheling.....	11.00 to 11.50
Machine-shop turnings.....	10.50 to 11.00
Cast borings.....	12.00 to 12.50
No. 1 cast.....	19.00 to 19.50
Grade bars, railroad.....	14.50 to 15.00
Stove plate.....	15.00 to 15.50
Railroad malleable.....	16.50 to 17.00

Cincinnati

CINCINNATI, OHIO, Nov. 22, 1916.—(By Wire.)

Pig Iron.—Southern iron for spot shipment has been sold in past years at higher prices than now prevail, but quotations for forward delivery have perhaps never been so high. Last week a large tonnage was contracted for at \$19, Birmingham basis, for shipment in the last half of next year. To-day's prices are set at a minimum of \$21, and some No. 2 foundry has been sold as high as \$22.50 for that delivery, while the asking price of one sales agency is \$23. Only a small tonnage of Southern iron is available for shipment this year, and a still smaller quantity is offered for movement in the first half of 1917. As far as Northern iron is concerned, \$26, Iron-ton, is the lowest obtainable figure, and only business for the last half of 1917 is wanted at this price. The furnaces in the Hanging Rock district are sold up to July 1 and have only a few straggling lots of off-grade iron to sell for prompt delivery. Both Northern and Southern basic contracts reported as closed for the last half of next year run up to nearly 70,000 tons. About 50,000 tons of this goes to melters in St. Louis territory. Other lots were taken by nearby consumers. Another sale of approximately 12,000 tons was made to an Ohio user. Most of this iron will come from the South. Southern iron contracts for the last half of next year are too numerous to mention, some

noteworthy ones being 2500 tons to a southern Ohio melter, 1000 tons to a central Indiana consumer, and 1500 tons to a central Ohio foundry. The inquiry has slackened, except from melters who need some iron to carry them through the first half of next year and who prefer to let their regular merchants provide them with their requirements rather than send out general inquiries. Only a limited business is reported in the silvery irons lately, but more interest is taken in malleable. The Ohio silvery irons are quoted to-day at \$31 to \$32 at furnace, based on 8 per cent analysis, and 10 per cent Bessemer ferrosilicon ranges from \$38 to \$40 at furnace. Based on freight rates of \$2.90 from Birmingham and \$1.26 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft.	\$24.40 to \$25.40
Southern coke, No. 2 f'dry and 2 soft.	23.90 to 24.90
Southern coke, No. 3 foundry.	23.40 to 24.40
Southern coke, No. 4 foundry.	22.90 to 23.90
Southern gray forge	22.40 to 23.40
Ohio silvery, 8 per cent silicon.	32.26 to 33.26
Southern Ohio coke, No. 1.	27.76
Southern Ohio coke, No. 2.	27.26
Southern Ohio coke, No. 3.	26.76
Southern Ohio malleable Bessemer.	27.26
Basic Northern	27.26
Lake Superior charcoal	26.20 to 27.20
Standard Southern carwheel.	26.90 to 27.40

(By Mail)

Coke.—For either prompt shipment furnace or foundry coke no exact prices can be quoted. Some rush lots of furnace coke have been sold as high as \$8 and a little foundry coke has gone at \$10 per net ton at oven. It is understood that last half business would be taken by some of the producers in the Connellsville district around \$5 for 48-hr. coke and from \$5.50 to \$6.50 for 72-hr. The shortage of cars makes it difficult for the producers to take care of old customers for any shipment within the next two months, and this class of business is not solicited. In the Wise County and Pocahontas fields, foundry contract prices range all the way from \$6 to \$8 per net ton at oven. New River producers appear to be out of the market for the time being.

Finished Material.—The nearby mills have advanced No. 28 galvanized sheets to 6.15c. and No. 28 black to 4.40c., f.o.b. Cincinnati or Newport, Ky. The local store stocks of galvanized sheets are so limited that they do not influence the situation either way. Both the mills and jobbers are now only anxious to take care of their old customers. Warehouse prices on other commodities have not changed. We quote, from stock, wire nails, \$3.15 per keg, base; barb wire, \$4.10 per 100 lb.; plates, 4.10c.; steel bars, 3.45c.; twisted steel bars, 3.60c.; rounds and hexagons, 2-in. and over, 4c.; small structural shapes, 3.35c. The nominal quotation on cold-rolled shafting is 10 per cent plus list, but higher than this has been obtained where prompt shipment could be made.

Old Material.—The market is characterized as wild. Prices have been advanced on several classes of scrap within the past week over \$2 per ton. The rolling mills and foundries are contracting heavily, as, even with the advances noted, there is a saving in using scrap in place of pig iron at the present cost of the latter. The following are dealers' prices, f.o.b. at yards, southern Ohio and Cincinnati:

Per Gross Ton	
Bundled sheet scrap	\$13.25 to \$13.75
Old iron rails	22.00 to 22.50
Relaying rails, 50 lb. and up.	26.50 to 27.00
Rerolling steel rails	21.25 to 21.75
Heavy melting steel scrap	19.00 to 19.50
Steel rails for melting	19.00 to 19.50

Per Net Ton	
No. 1 railroad wrought.	\$19.25 to \$19.75
Cast borings	6.00 to 6.50
Steel turnings	6.00 to 6.50
Railroad cast	15.00 to 15.50
No. 1 machinery cast.	16.75 to 17.25
Burnt scrap	10.00 to 10.50
Iron axles	31.75 to 32.25
Locomotive tires (smooth inside)	25.00 to 25.50
Pipes and flues	13.00 to 13.50
Malleable cast	14.00 to 14.50
Railroad tank and sheet.	11.50 to 12.00

The Iroquois Iron Company, Chicago, will equip two more of its blast furnaces with Brassert gas-washing and drying equipment, the order having been placed with Heinrich J. Freyn, Peoples Gas Building, Chicago.

Birmingham

BIRMINGHAM, ALA., Nov. 21, 1916.

Pig Iron.—The week closing Nov. 18 was featured by sales of second half iron by one large interest at \$19, but by the middle of the week asked \$20. The leading maker sold a fair tonnage, both of spot and first half, on the \$20 basis, but declined to open its books for the second half. The Alabama Company booked 7000 to 8000 tons for second half at \$21 and placed an equal tonnage of high silicon Clifton iron for the same delivery at \$24. The premium on this metal is usually \$2 per ton. On Monday of this week the largest foundry-iron interest, which had sold freely into the second half at \$19 and then \$20, advanced for that delivery to \$21 and was quoting spot at \$23. One consumer was asking for 10,000 tons for second half delivery and offering \$23. Some spot sales at \$24 were reported. The leading interest was asking around \$23 for all deliveries. Probably 90 per cent of first half capacity has been entered on furnace order books and possibly 200,000 for second half delivery has been booked. The tone of the market is a little more conservative; not that the iron men could not get still more for the metal—but they are more careful as to forward bookings, the financial cream of the trade getting the best showing. Belated consumers in the North and Middle West, as well as the South, are hammering the market to get in. Shipments continue heavy. October car movements in Alabama totaled 87,156, an increase over September of 5000 and of 7000 cars over October, 1915. The output will be increased by one Tennessee and one Republic stack in the near future. Gossip of consolidations of Southern steel and iron interests, in which mention is made of the Sloss-Sheffield and the Gulf States, are without apparent foundation. Seekers after basic metal have made further offers to Southern furnacemen, but they cannot take on more basic under the circumstances. We quote for second half of 1917 and spot, per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 1 foundry and soft.	\$21.50 to \$23.50
No. 2 foundry and soft.	21.00 to 23.00
No. 3 foundry.	20.50 to 22.50
No. 4 foundry.	20.25 to 22.25
Gray forge	20.00 to 22.00
Basic	21.00 to 23.00
Charcoal	25.00

Cast-Iron Pipe.—Southern pipe makers were slow to make the advances warranted by the rise in the price of pig iron, but they finally did so, the advance of \$1 marked up the week previous being raised by one of \$3 to \$5 more. Just prior to the advances sufficient business came in to justify the continuance of the present scope of operations, but it is more and more apprehended that high prices will curtail the output. The leading pipe company announced a scale of \$35 and \$32 for 4-in. and 6-in. and upward, respectively, while another large maker still quotes \$30 and \$27 respectively. We quote, per gross ton, f.o.b. pipe shop yards, as follows: 4-in., \$34; 6-in. and upward, \$31, with \$1 added for gas pipe and special lengths.

Coal and Coke.—Steam coal averages around \$2.50 to \$3 per ton, and in some instances steam as well as domestic coal brings as much as \$4.50 and \$5. The railroads have been extremely watchful of cars. As a result, contract coal purchasers have been protected as to deliveries over rush and high-priced spot orders. Coke rules a little higher all the time, the low-priced contracts now being out of the way. The lowest contract coke, even to preferred customers, is around \$4.25 to \$4.50 per net ton at oven, with spot and new contract business ruling at \$4.50 to \$5 for standard beehive, and furnace coke at \$3.50 to \$4, according to circumstances. The Woodward Iron Company has let a contract to the Otto Coking Company, New York, for 60 by-product ovens of the Wilputte type.

Old Material.—All lines of scrap are active. Wrought has practically disappeared from the local yards, owing to renewal of operations at certain plants. Prices are firm at the advances of the previous week and, in instances, higher figures are secured. There is no exception in the demand. Southern mills secure most of the

material owing to propinquity to yards and activity of operations. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old steel axles.....	\$26.00 to \$30.00
Old steel rails.....	13.00 to 13.50
No. 1 wrought.....	16.00 to 17.00
Heavy melting steel.....	12.50 to 13.00
No. 1 machinery cast.....	12.00 to 12.50
Carwheels.....	11.50 to 12.00
Tram carwheels.....	11.00 to 11.50
Stove plate and light cast.....	10.00 to 10.50

Cleveland

CLEVELAND, OHIO, Nov. 21, 1916.

Iron Ore.—The vessel rate for carrying ore from ports at the head of Lake Superior to lower Lake ports has been fixed at \$1 a ton net for 1917, an advance of 50c. over this season's contract rate, which was 50c. a ton net, or 60c. including the unloading charge. The \$1 rate has prevailed for wild charters during the greater part of this season, and it has been expected for some time that it would be established as the rate for the coming season. The Escanaba rate has not been fixed. Shippers are holding out for the 80c. rate from this port. Chartering is not active, the large bulk of the vessel tonnage having been tied up before the rates were fixed. The new \$1 rate, equivalent to \$1.10 gross, is the highest that has prevailed since 1909, when the contract rate was \$1.25 gross. However, the wild rate for the year was only 84½c. Reports from Pittsburgh indicate that ore sales have been closed at an advance of \$1.30 on this year's prices, and while some ore companies have been disposed to ask \$1.50 more than this season's prices, it is considered that the market for 1917 ore is practically established on the following basis: Old range Bessemer, \$5.75; Mesaba Bessemer, \$5.50; old range non-Bessemer, \$5; Mesaba non-Bessemer, \$4.85.

Because of the cold weather during the past few days, and the frozen condition of the ore, shipments from upper Lake ports were practically at a standstill for a week, and a large number of boats are now at the upper Lake ports, and will be delayed some time in getting cargoes. Due to this delay, some of the shippers will be unable to bring down all their contract ore unless weather conditions are very favorable.

Pig Iron.—The market continues fairly active in spite of the advance in prices. Sales of a considerable tonnage of foundry and malleable iron for first and last half of next year were made during the week at \$25 by northern Ohio furnaces and following an advance in prices some foundry-iron sales were booked at \$26. The Cleveland price has been advanced to \$27 for No. 2 foundry and one Cleveland interest is now asking \$28. Sales of foundry iron are reported at \$27 for first half and malleable iron at the same price for this year's delivery. Southern pig iron is fairly active, with the tendency still upward. A number of sales are reported at \$20, Birmingham, for No. 2 for last half and one interest that was selling at this price in this territory last week has advanced to \$22. Southern iron for delivery before July appears scarce, and for prompt shipment and first half deliveries \$22 and higher are being asked. We quote, delivered Cleveland, as follows:

Bessemer	\$30.95
Basic	25.95
Northern No. 2 foundry.....	27.30
Southern No. 2 foundry.....	26.00
Gray forge	25.45
Jackson County silvery 8 per cent silicon.....	31.00
Standard low phos., Valley furnace..	43.00 to 44.00

Coke.—There is some demand for prompt shipment foundry coke, which is quoted at \$9.25 to \$10 per net ton at oven for standard Connellsville makes. Producers generally are declining to quote for first half. One foundry has covered for its requirements for the entire year of 1917 at \$7.50.

Finished Iron and Steel.—The demand for steel for early shipment continues heavy, and one mill that has been taking orders for fairly early delivery is now unable to make shipments of steel bars within two to four months and on structural material within four to six months. Some of the local fabricating shops have

placed contracts for first quarter at 3c., Pittsburgh, for bars and structural material and 4c. for plates. The Carnegie Steel Company has advanced its prices to 2.90c. for bars, 3c. for structural material and 3.50c. for plates and has made an advance of \$4 a ton on light rails. Plates continue in heavy demand and are quoted by local mills at 4c., Pittsburgh, for light gages and 4.50c. for heavy plates. An Eastern mill is quoting universal plates at 3.75c. to 4c. and sheared plates at 4.75c. to 5c. An inquiry is pending for about 12,000 tons of steel for boats to be built by the Lake shipyards. On this inquiry 4.50c. has been quoted for the hull plates and 10.40c. for the marine boiler plates, U. S. specifications. One Eastern mill has withdrawn from the forging billet market in this territory, having nothing to sell for the first half. Prices on hard steel bars for reinforcing purposes have stiffened up to 2.65c. and 2.75c., at mill. Local bar-iron mills have withdrawn from the market, being unwilling to pay the present prices for scrap. The sheet situation is growing worse. There is a heavy volume of inquiry and some mills that are not entirely sold up are unwilling to book additional orders, their withdrawal from the market being particularly due to their inability to secure deliveries on sheet bars and the unsatisfactory situation resulting from the coal and car shortage. Sales from the Cleveland warehouse of a Valley mill are being made at 4.60c. to 4.75c. for black sheets and 6c. for galvanized. We quote mill prices at 4.25c. to 4.50c., Ohio mill, for No. 28 black; 3.75c. for No. 10 blue annealed and 5.50c. to 6c. for No. 28 galvanized. The Brier Hill Steel Company will begin operation Jan. 1 of the plant of the Western Reserve Steel Company, Warren, Ohio, which it purchased last week and will specialize in this plant on finished sheets for automobile and metal furniture trade. Warehouse prices are: Steel bars, under 2 in., 3.50c.; over 2 in., 4c.; plates, 4.10c.; structural material, 3.60c.; iron bars, 3.45c.

Bolts, Nuts and Rivets.—Bolt and nut prices have been advanced from 5 to 7½ per cent and rivet prices \$5 per ton. The demand for bolts and nuts is heavy. Contracts for the first quarter are now being taken from the jobbers. Rivets are now being quoted at 4.25c., Pittsburgh, for structural and 4.35c. for boiler rivets for delivery through the first half. In new bolt and nut prices a differential has been provided between blank and tapped nuts, which have been commanding the same prices. Bolt and nut discounts are as follows:

Common carriage bolts, ¾ x 6 in., smaller or shorter, rolled thread, 50; cut thread, 40 and 7½; larger or longer, 35. Machine bolts with h.p. nuts, ¾ x 4, smaller or shorter, rolled thread, 50 and 5; cut thread, 40, 10 and 5; larger or longer, 40. Lag bolts, gimlet or cone point, 50. Square and hexagon h.p. nuts, blank, \$2.60 off the list; tapped, \$2.40 off. C.p.c. and t. hexagon nuts, all sizes, blank, \$2.50 off; tapped, \$2.25 off. Cold pressed semi-finished hexagon nuts, 60 off.

Old Material.—Further advances in prices of from 50c. to \$1 and more a ton have been made on most grades. The market is very firm and dealers expect still higher prices. There is considerable activity, mills taking about everything offered. Dealers claim the supply is scarce. It is stated that the New York Central Lines have decided to place no more scrap on the market for the present and that some of the other railroads are holding back on their scrap. However, the Baltimore & Ohio has a list out for 15,000 tons or more. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton

Steel rails	\$19.50 to \$20.00
Steel rails, rerolling.....	22.00
Steel rails under 3 ft.....	23.00 to 23.25
Iron rails	24.00 to 25.00
Steel car axles	40.00 to 42.00
Heavy melting steel scrap.....	20.50 to 21.00
Carwheels	15.50 to 16.00
Relaying rails, 50 lb. and over.....	25.00
Agricultural malleable	15.50 to 16.00
Railroad malleable	19.50 to 20.00
Steel axle turnings	12.50 to 13.00
Light bundled sheet scrap.....	12.25 to 12.75

Per Net Ton

Iron car axles	\$36.00 to \$37.00
Cast borings	8.50 to 9.00
Iron and steel turnings and drillings..	8.00 to 8.50
No. 1 busheling	17.00 to 17.50
No. 1 railroad wrought	21.00 to 21.50
No. 1 cast	17.00 to 17.50
Railroad grate bars	13.25 to 13.50
Stove plate	13.25 to 13.50

St. Louis

ST. LOUIS, Mo., Nov. 20, 1916.

Pig Iron.—The larger foundrymen have covered for the first half at least. Business offered for the second half of 1917 is being handled gingerly by the furnaces. There is a considerable inquiry for low-phosphorus iron, wanted for making ingot molds. Important transactions include one of 1000 tons of Bessemer ferrosilicon at \$36. Between 800 and 1000 tons of ferromanganese, price withheld, was bought by one of the largest open-hearth steel-casting concerns. Of No. 2 Southern foundry iron possibly 8000 tons was bought. Inquiries outstanding include 1000 tons of basic Northern and 400 tons of No. 2 Southern foundry. Other tonnages are known to be in negotiation.

Finished Iron and Steel.—The prices here, although they are nominal in view of the present inability to deliver, are: Shapes, 2.90c.; bars, 2.80c.; plates, 3.35c., Pittsburgh base. The advance in steel rails of \$5 per ton has increased the interest in standard section material, bringing nearly all of the railroads in this territory into the market with tentative inquiries but without specific tonnage or delivery mentioned. Movement out of warehouse continues free; for stock out of warehouse we now quote as follows: Soft steel bars, 3.40c.; iron bars, 3.30c. to 3.35c.; structural material, 3.40c.; tank plate, 4.05c.; No. 10 blue annealed sheets, 3.85c.; No. 28 black sheets, cold-rolled, one pass, 4.50c.; No. 28 galvanized sheets, black sheet gage, 6.20c.; this last quotation having been sharply influenced by the advance in zinc ore and spelter.

Old Materials.—The scrap market is sharply higher as a result of a big demand, much of which comes from dealers who have contracts to fill and are without the materials to deliver. The largest consumer in this market is also an active buyer, and all of the plants in this vicinity are using scrap rapidly. The conditions point to still higher prices in the opinion of the best informed, particularly on steel scrap. There has been some particularly sharp inquiry for rerolling rails and also for the heavy melting steel scrap, which has prompted disproportionately higher prices on these than on some of the other items in the list. Relaying rails are very badly wanted, with no supply available, and this applies both to standard section and light materials. The lists out during the week were one of 600 tons from the Chicago, St. Paul, Minneapolis & Omaha and 500 tons from the Vandalia. We quote dealers' prices, f.o.b. customers' works, St. Louis industrial district, as follows:

Per Gross Ton	
Old iron rails	\$23.00 to \$23.50
Old steel rails, rerolling	24.50 to 25.00
Old steel rails, less than 3 ft.	24.50 to 25.00
Relaying rails, standard section, subject to inspection	25.00 to 27.00
Old carwheels	17.00 to 17.50
No. 1 railroad heavy melting steel scrap	21.50 to 22.00
Heavy shoveling steel	19.00 to 19.50
Ordinary shoveling steel	16.50 to 17.00
Frogs, switches and guards cut apart	21.50 to 22.00
Bundled sheet scrap	11.50 to 12.00

Per Net Ton	
Iron angle bars	\$22.50 to \$23.00
Steel angle bars	20.00 to 20.50
Iron car axles	34.50 to 35.00
Steel car axles	35.50 to 36.00
Wrought arch bars and transoms	26.00 to 26.50
No. 1 railroad wrought	21.50 to 22.00
No. 2 railroad wrought	20.00 to 20.50
Railroad springs	21.00 to 21.50
Steel couplers and knuckles	22.50 to 23.00
Locomotive tires, 42 in. and over, smooth inside	25.50 to 26.00
No. 1 dealers' forge	18.50 to 19.00
Cast-iron borings	9.50 to 10.00
No. 1 busheling	17.75 to 18.25
No. 1 boilers, cut to sheets and rings	14.00 to 14.50
No. 1 railroad cast scrap	14.75 to 15.25
Stove plate and light cast scrap	10.50 to 11.00
Railroad malleable	15.00 to 15.50
Agricultural malleable	13.00 to 13.50
Pipes and flues	15.50 to 16.00
Heavy railroad sheet and tank scrap	14.00 to 14.50
Railroad grate bars	12.00 to 12.50
Machine shop turnings	10.00 to 10.50

Coke.—An excited condition prevails. Melters, unable to get deliveries on contracts, buy for prompt shipment. Sales have been made of 72-hr. best selected Connellsville foundry at \$8.50 per net ton, with 48-hr. coke for furnace use at \$8. There is no willingness to make

contracts at the present time. All sales have been in small quantities, but one inquiry is for 15,000 tons of furnace coke for smelter use. By-product coke, so far as it is available for delivery, is being held on a parity with Connellsville product.

New York

NEW YORK, Nov. 22, 1916.

Pig Iron.—There has been an active market on the basis of the higher prices established in the past week. Southern iron was sold in good-sized lots in the Hudson River valley and in New England on the basis of \$19 to \$19.50 at furnace for No. 2 foundry in the first half of last week. For delivery in the second half of 1917 sales of Alabama iron have been made at \$20 to \$21, Birmingham, this week, and for early delivery at \$21 to \$22. For warrants \$20, Birmingham, has been bid and transactions have ranged from \$21 to \$23. The amount of warrant iron has been reduced considerably in the past month. Speculative holders are not inclined to sell freely, holding for still higher figures. The International Steam Pump Company was in the market recently for the second half of 1917, asking for a total of 25,175 tons. It is understood the purchases were not made within the time for which bids were asked, and new quotations were taken on which awards were to be made this week. A large soil pipe interest is in the market for 5000 to 10,000 tons for second half of 1917 and may buy an additional 5000 to 10,000 for first half. Considerable buying of malleable iron for New England for all of next year is expected, as some buyers have yet to cover a relatively large portion of their needs for 1917. Virginia furnaces have been alternatively selling and withdrawing from the market, and the range of quotations in that district now is \$24 to \$26 at furnace for No. 2 X iron. The quotations of Pennsylvania furnaces for next year run from \$26 to \$27 for No. 2 X. One Pennsylvania furnace has made a sale of 10,000 tons of foundry iron for export in the next two or three months. As high as \$28 has been paid for export foundry iron. Buffalo producers ask \$27 to \$28 at furnace for No. 2 X, and as high as \$30 has been quoted in that district. Quite a price range appears in all transactions from the various districts in the past week, but the scale of buying has been larger than was expected and sellers predict still higher prices. The perplexity of buyers is greatest in respect to second half requirements. Some of them are disposed to cover for only part of their iron for that period, and some have not covered at all. The New Haven embargo was removed Nov. 18 and New England foundries are again taking measures to maintain the former size of their stocks. Japan is about closing for 4000 tons of low-phosphorus pig iron. Export low phosphorus has sold at \$45 to \$46. We quote at tidewater for early delivery: No. 1 foundry, \$28 to \$28.50; No. 2 X, \$27 to \$28; No. 2 plain, \$27 to \$27.50; Southern iron at tidewater, \$27.50 to \$28 for No. 1 and \$27 to \$27.50 for No. 2 foundry and No. 2 soft.

Ferroalloys.—Sales of domestic ferromanganese in the past week have reached considerable proportions, probably 5000 tons, and it is understood that \$164 to \$165, delivered, was generally obtained as against sales at \$160 not long ago. In some cases the delivery extends well into 1917. Inquiries for about 2000 tons are before the market and the demand is rather more active than for some time. The British alloy is quoted at \$164, seaboard, and a few sales have been made at this price. One interest at least would shade this quotation for delivery late in 1917. Arrivals continue at the pace recently maintained, over 7900 tons having been imported in October. Spiegeleisen, 20 per cent, is firmer and \$50 to \$55, furnace, is now asked, as against \$47 to \$50 a week ago. Bessemer ferrosilicon is in strong demand, the 10 to 12 per cent grade commanding \$35 to \$40 per ton, furnace. Contracts for 1917 are being made for 50 per cent ferrosilicon at \$100 per ton delivered for carload lots and less and \$99 per ton for larger quantities. There are only two prices instead of three formerly. Domestic producers are sold well into 1917. Inquiry for nearby delivery is

very active with little material available. There are also numerous inquiries from foreign countries, such as Italy and Great Britain. One foreign consumer desires 300 tons of 50 per cent ferrosilicon, 200 tons of 75 per cent and 30 tons of 90 per cent ferrosilicon. Considerable business has been done.

Structural Material.—The 27,000 tons of 6, 7 and 8-in. beams for France appear to have all been closed, and apparently the business was done at about 3.40c., Pittsburgh basis. The leading event is an advance by the United States Steel Corporation to 3c., Pittsburgh, and the best price for the most attractive lot for building work is now minimum at 2.85c., Pittsburgh. Bridge building of large portions for railroads, forecasted weeks ago in this column, seem imminent, following recent pretty generous buying for this kind of structures. Several thousand tons for the Lehigh Valley may be mentioned. A considerable volume of additions to buildings is constantly moving, though large building projects are hardly conspicuous in number. The report of the Bridge Builders' and Structural Society, noted elsewhere, is a close indication of the surprising total made up of numerous unadvertised jobs. It is understood that the McClintic-Marshall Company, through the Riter-Conley Mfg. Company, has closed for 10,000 tons for the Maryland Steel Company, and for 4800 tons for the Youngstown Sheet & Tube Company. A large amount of work is expected in connection with expansion and changes at the yards of the Newport News Shipbuilding & Dry Dock Company. A garage on West Sixty-sixth Street, involving 250 tons, has been awarded to the Guerber Engineering Company; the H. E. Mitler apartment, 500 tons, to the Belmont Iron Works; transportation towers, several hundred tons, to Milliken Brothers, Inc.; and it is reported that the Sheffield Farms creamery, 600 tons, has been placed with the Levering & Garrigues Company. New building projects include an apartment for A. S. Cochran, 21 West Fifty-eighth Street, 400 tons; Studio Building, Fifty-ninth Street and Sixth Avenue, revised, 800 tons; and a Bing & Bing hotel, 48 West Forty-seventh Street, 500 tons. We now quote mill shipments of plain material at 3.019c. to 3.169c., New York, and from warehouse at 3.50c., minimum.

Steel Plates.—Another advance of \$5 by the Steel Corporation, bringing plates to 3.50c., Pittsburgh, and higher warehouse prices are indicative of conditions. The prodigious buying of railroad cars is making itself felt in the demand for universal and the narrower sheared plates, and at this writing buyers are making efforts to place round lots for delivery over the next few months at less than 3.75c., Pittsburgh. On ship plates, even for the third quarter, 6c. has been quoted, but no considerable business has been done at higher than 5.50c. Following the statement reported a month ago that car plates would be 4c. by the first of the year, one shipbuilder owns to expecting that 5c. will be ruling for shipbuilding purposes by that time; and certain it is that little can be obtained now in the first half at 4.75c. for the wide plates. Norwegian interests are having difficulty in placing some 12,000 to 15,000 tons for the last half for four ships to be built on the Pacific coast. Some 2000 tons is under consideration for the Staten Island Shipbuilding Company. Incidentally, it is stated that further ship contracting for Norway ownership is not to be expected, as that country has already purchased a total vessel capacity of 1,200,000 tons. Some 9000 to 10,000 cars have been bought, 2000 each of the New York Central, Burlington, Illinois Central, and Great Northern. We quote universal plates in some weeks, and sheared plates up to 84 in., and in about three months, at 3.919c. to 4.169c., New York; sheared plates wider than 84 in., with little available in the first half, at 4.419c. to 5.669c.; and all plates for indefinite delivery at 3.669c. New York. Out of store we now quote 4.5c. to 4.75c., New York.

Bars.—Some last-half-of-1917 shell-steel contracts are now being settled, it is confidently asserted, and at 4c. to 4.50c. The 17,000 tons of 2½-in. and smaller angles for France are believed to have been bought, but it is not known from what mills. Along with plates and shapes, an advance has been announced by the

Steel Corporation of \$4 per ton, or to 2.90c., Pittsburgh. Bar iron is strong, and some purchases on foreign account of bar-iron products are under quiet consideration. We quote mill shipments of steel bars at 3.069c. to 3.169c., New York, with small quantities available, in 60 to 90 days, and iron bars at 2.669c., New York. From warehouses we quote steel bars at 3.50c., and iron bars at 3.40c., New York.

Cast-Iron Pipe.—The city of New Bedford, Mass., opens bids to-day on 760 tons of 6 to 30 in. pipe and 60 tons of castings. This is the only public letting of importance that has recently come out. Private buying for spring delivery continues brisk. Export inquiries are coming out in good volume but the difficulty of securing vessel room presents a formidable obstacle to the closing of contracts. The market is firm. Carload lots of 6-in., class B and heavier, are quoted at \$37.50 per net ton, tidewater, with \$1 per ton extra for class A and gas pipe.

Old Material.—Conditions are very different from those prevailing only a short time ago. Buying is active and dealers say that anything can now be sold. The demand is not only urgent from domestic consumers but large inquiries have appeared for export. Offers of \$21 to \$22 have been made for heavy melting steel scrap for shipment abroad. Brokers quote buying prices about as follows to local dealers and consumers, per gross ton, New York:

Heavy melting steel scrap (for eastern Pennsylvania shipment).....	\$17.50 to \$18.00
Old steel rails (short lengths) or equivalent	19.75 to 20.00
Relaying rails	31.50 to 32.00
Rerolling rails	24.50 to 25.00
Iron and steel car axles (for export) ..	41.50 to 42.00
No. 1 railroad wrought.....	22.50 to 23.00
Wrought-iron track scrap.....	20.00 to 20.50
No. 1 yard wrought, long.....	17.50 to 18.00
Light iron (nominal).....	3.50 to 4.00
Cast borings (clean).....	9.50 to 9.75
Machine shop turnings.....	8.00 to 8.50
Mixed borings and turnings.....	8.00 to 8.50
Wrought pipe (not galvanized or enameled)	15.50 to 16.00

Cast scrap has been purchased much more freely at advancing prices. Dealers' quotations to consumers of cast scrap are as follows, per gross ton, New York:

No. 1 cast (machinery).....	\$20.50 to \$21.00
No. 2 cast (heavy).....	19.50 to 20.00
Stove plate	15.50 to 16.00
Locomotive grate bars.....	15.50 to 16.00
Old carwheels	20.50 to 21.00
Malleable cast (railroad).....	17.50 to 18.00

Buffalo

BUFFALO, N. Y., Nov. 21, 1916.

Pig Iron.—There is some restriction in buying owing to the inability of consumers to obtain deliveries desired. One inquiry before the market is for 25,000 tons of basic for delivery in the last half of 1917, for which negotiations are still pending. One of the largest producers here has retired temporarily from the market owing to the filled-up condition of order books. Prices appear to range according to untaken capacity which different producers have available, and at least one interest is still quoting \$25 to \$27 for extended 1917 delivery, while another is holding out for a minimum of \$30 on any grade for such delivery as it is able to make. We quote as follows for last quarter and first half delivery, f.o.b. furnace, Buffalo:

High silicon irons	\$27.00 to \$28.00
No. 1 foundry	27.00 to 28.00
No. 2 X foundry	27.00 to 28.00
No. 2 plain	27.00 to 27.50
No. 3 foundry	27.00 to 27.50
Gray forge	27.00 to 27.50
Malleable	27.00 to 28.00
Basic	30.00
Bessemer	30.00 to 31.00
Charcoal, according to brand and analysis	27.00 to 27.50

Finished Iron and Steel.—There appears to be a greater divergence in prices than has prevailed at any time. Higher prices than usual Pittsburgh quotations on definite offers (practically all contract tonnage) have been declined by sellers in several instances. There is evidently greater reluctance on the part of sellers to quote prices at all. The agency of one of the largest

independent mills announces that it is now out of the market on iron bars, due partly to the shortage of scrap. There is a decidedly strong demand for sheets, and prices are being held firmly, with frequent further advances reported.

Old Material.—Local consumers appear to have covered their requirements for the present. There are no tonnages of heavy melting steel available, and attention is now turning to the cheaper grades of scrap, particularly borings and turnings. We quote dealers' asking prices, per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel.....	\$20.00 to \$20.50
Low phosphorus billet and bloom ends.....	25.00 to 25.50
No. 1 railroad wrought.....	22.00 to 22.50
No. 1 railroad and machinery cast.....	19.00 to 20.00
Steel axles.....	35.00
Iron axles.....	35.00
Carwheels.....	18.00 to 18.50
Railroad malleable.....	18.00 to 18.50
Machine shop turnings.....	9.00 to 9.25
Heavy axle turnings.....	14.00 to 14.50
Clean cast borings.....	9.50 to 10.00
Iron rails.....	20.50 to 21.00
Locomotive grate bars.....	14.00 to 14.50
Stove plate (gross ton).....	14.25 to 14.75
Wrought pipe.....	14.50 to 15.00
No. 1 busheling scrap.....	17.50 to 18.00
No. 2 busheling scrap.....	12.50 to 13.00
Bundled sheet scrap.....	13.50 to 14.00

British Steel Market

Pig Iron Firm and Active—American Billets at \$70

(By Cable)

LONDON, ENGLAND, Nov. 22, 1916.

The pig-iron market is firm and the demand is active. Black sheets are quoted at £19 15s. Tin plates are irregular, but clearances from makers' stocks are better. For American 4-in. billets \$70 is asked and for wire rods £20 is bid, both for January-March delivery c.i.f. Liverpool. We quote as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 33s.
Steel black sheets, No. 28, export, f.o.b. Liverpool, £19 5s. against £20 a week ago.
Steel ship plates, Scotch, delivered local yards, £13 17s. 6d.
Steel rails, export, f.o.b. works, £10 17s. 6d.
Hematite pig iron, f.o.b. Tees, 142s. 6d., compared with about 140s. a week ago.
Sheet bars (Welsh) delivered at works in Swansea Valley, £15 5s. nominal.
Steel bars, export, f.o.b. Clyde, £18.
Ferromanganese (nominal), £33.
Ferrosilicon, 50 per cent, c.i.f., £27.

Pig-Iron Output Increasing—Less Demand for Billets—Manganese Ore Firmer

(By Mail)

LONDON, ENGLAND, Oct. 31, 1916.

The pressure in pig iron is such that current production is being rapidly absorbed, and manufacturers would welcome additional deliveries. The efforts made to add to the output are fairly successful. Four more blast furnaces having started operations in the East coast district, and this should make itself felt.

Export business has been decidedly more restricted, but f.o.b. terms have hardened, while surplus quantities in producers' hands are still extremely small. Hematite export licenses are practically unobtainable. The requirements of steel works are as great as ever, and the demand continues rather in excess of current output. There has been practically no further change in the home maximum prices, Cleveland iron remaining at 87s. 6d., and East Coast hematite at 122s. 6d.

The great bulk of productive iron and steel capacity is under close official control. The labor problem is as difficult as ever, and the prosecution of operations on a scale sufficient to cope with running contracts is not an easy matter, inasmuch as the supply of raw material is not too plentiful. The use of steel for ordinary or mercantile enterprise has been further curtailed, so that merchant business is being cut down to unimportant dimensions. The tendency of prices is as firm as ever in view of the abnormally high cost of production.

Inquiries for billets are few even at the reduced

rates quoted lately in various quarters, despite the firmer tendency in America. Consumers have presumably secured their needs over the end of the year. Four-inch material can still be had rather below \$65 for January-March shipment, c.i.f. Liverpool, but there is virtually nothing doing. This also applies to wire rods and sheet bars, quotations for which are purely nominal. There is a steady inquiry for finished steel, especially for shipbuilding. Prices have risen again materially, while big premiums are being paid for anything like near shipment of steel plates.

With the further reduction of the output of tin plate and galvanized as well as black steel sheets, export business has fallen off further, for the output is not such as to leave any big surplus for export. The fact that an attempt is being made to fix a minimum basis price for tin plate against A certificates has served to strengthen the market, though a confirmation of this has yet to be awaited. This figure is fully justified by the cost of production, though the position is complicated by the lack of new orders.

There has been a little more life in ferromanganese for shipment in the early months of next year chiefly to Italy at about £33 to £34 f.o.b., while the quotation for this year is quite nominal, makers having nothing more to sell. Indian manganese ores rule firmer.

Fabricated Steel Work in October

The bridge and structural shops of the country took contracts in October corresponding in the aggregate to 77 per cent of their capacity. This represents about 132,000 tons, and is more than any month since May, when about 137,500 tons was put under contract. In the four months of the interim the rate of contracting has been about 95,000 tons, so there would seem to be an almost 40 per cent improvement since the temporary lull which occurred in steel buying toward the end of the first half of this year. The average rate of contracting in the 20 months since February, 1915, when the improvement after the shock of the European war was first felt, has been about 130,000 tons per month.

Manganese Ore Imports at Record Rate

Manganese ore imports into the United States continue at a phenomenal rate, and now exceed similar imports into Great Britain. Those for September were 73,536 gross tons. The imports in July, August and September have been 232,199 tons. The total to Oct. 1, 1916, is now 469,222 tons, against 173,992 tons to Oct. 1, 1915, and 215,274 tons to Oct. 1, 1914. The British imports to Oct. 1, 1916, were only 348,394 gross tons. The monthly rate for the first nine months of this year is 52,136 tons, against the previous record of 28,757 tons per month in 1913.

Rogers, Brown & Co. say in their weekly market report, referring to export demand: "Sweden has been an important factor. It has recently placed through one agency alone 6500 tons of Southern foundry iron and 650 tons of Southern high silicon high phosphorus iron. Italy is inquiring for 5000 tons of low silicon foundry iron, 3000 tons of Bessemer ferrosilicon and in addition there is an inquiry on the market for 50,000 tons of standard Bessemer for export shipment beginning promptly and running through the first quarter of next year."

Spanish iron and steel companies are purchasing their own ships, as a result of high freight rates, so as to transport their coal and raw materials. The Sociedad de Altos Hornos de Vizcaya, of Bilbao, besides having recently bought five large steamers, two with a capacity of 4000 tons each, has placed a contract with a Spanish shipbuilding company for two more at a cost of about \$400,000 each. This company has invested lately about \$3,000,000 in steamships. The Sociedad Metallurgica Duro-Filguera has ordered two steamers also.

The Chicago Steel & Wire Company, 1123 West Thirty-seventh Street, Chicago, has purchased a plot 190 x 310 ft., on which it will erect a manufacturing building to cost \$40,000.

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30.7c.; Birmingham, Ala., 45c. Denver, pipe, 76.1c., minimum carload, 46,000 lb.; structural steel and steel bars, 83.6c.; minimum carload, 36,000 lb. Pacific coast (by rail only), pipe, 65c.; structural steel and steel bars, 75c., minimum carload, 50,000 lb.; structural steel and steel bars, 80c., minimum carload, 40,000 lb. No freight rates are being published via the Panama Canal, as the boats are being used in transatlantic trade.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs $\frac{1}{4}$ in. thick and over, and zees 3 in. and over, 3c. to 3.1c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in., on one or both legs.	.10
Angles, 3 in. on one or both legs less than $\frac{1}{4}$ in. thick, as per steel bar card, Sept. 1, 1909.	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail).	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.	.20 to .80
Deck beams and bulb angles.	.30
Handrail tees.	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive.	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive.	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting to lengths 3 ft. and over.	

Plates.—Tank plates, $\frac{1}{4}$ in. thick, 6 in. up to 100 in. wide, 3.50c. to 4.25c., base, net cash, 30 days, or $\frac{1}{2}$ of 1 per cent discount in 10 days, carload lots. Extras are:

Quality Extras

	Cents per lb.
Tank steel	Base
Pressing steel (not flange steel for boilers)	.10
Boiler and flange steel plates	.15
"A. B. M. A." and ordinary firebox steel plates	.20
Still bottom steel	.30
Locomotive firebox steel	.50
Marine steel, special extras and prices on application.	

Gage Extras

Rectangular, $\frac{1}{4}$ in. thick, over 6 in. wide to 100 in. wide. Base	
Lighter than $\frac{1}{4}$ in., to 3/16 in., up to 72 in. wide.	.10
Lighter than $\frac{1}{4}$ in., including 3/16 in., over 72 in. to 84 in.	.20
Lighter than $\frac{1}{4}$ in., including 3/16 in., over 84 in. to 96 in.	.30
Lighter than $\frac{1}{4}$ in., including 3/16 in., over 96 in. to 100 in.	.40
Lighter than $\frac{1}{4}$ in., including 3/16 in., over 100 in. to 102 in.	.45
Lighter than 3/16 in., including No. 8, up to 72 in. wide.	.15
Lighter than 3/16 in., including No. 8, over 72 in. to 84 in.	.25
Lighter than 3/16 in., including No. 8, over 84 in. to 96 in.	.35
Lighter than No. 8, including No. 10, up to 60 in. wide.	.30
Lighter than No. 8, including No. 10, over 60 in. to 64 in.	.35
Up to 72 in. and not less than 10.2 lb. per sq. ft. will be considered $\frac{1}{4}$ in.	
Over 72 in. must be ordered $\frac{1}{4}$ in. thick on edge, or not less than 11 lb. per sq. ft. to take base price.	
Over 72 in. wide, ordered less than 11 lb. per sq. ft., down to weight of 3/16 in., take price of 3/16 in.	
Over 72 in., ordered weight 3/16 in., take No. 8 price.	
Over 72 in., ordered weight No. 8, take No. 10 price.	

Width Extras

Over 100 in. to 110 in. inclusive.	.05
Over 110 in. to 115 in. inclusive.	.10
Over 115 in. to 120 in. inclusive.	.15
Over 120 in. to 125 in. inclusive.	.25
Over 125 in. to 130 in. inclusive.	.50
Over 130 in.	1.00

Length Extras

Universal plates 80 ft. long up to 90 ft. long.	.05
Universal plates 90 ft. long up to 100 ft. long.	.10
Universal plates 100 ft. long up to 110 ft. long.	.20

Cutting Extras

No charge for rectangular plates to lengths 3 ft. and over.	
Lengths under 3 ft. to 2 ft. inclusive.	.25
Lengths under 2 ft. to 1 ft. inclusive.	.50
Lengths under 1 ft.	1.55
Circles 3 ft. in diameter to 100 in.	.30
Circles over 100 to 110 in. (width extra)	.35
Circles over 110 to 115 in. (width extra)	.40
Circles over 115 to 120 in. (width extra)	.45
Circles over 120 to 125 in. (width extra)	.55
Circles over 125 to 130 in. (width extra)	.80
Circles over 130 in. (width extra)	1.30
Circles under 3 ft. to 2 ft. inclusive.	.55
Circles under 2 ft. to 1 ft. inclusive.	.80
Circles under 1 ft.	1.85
Half circles take circle extras.	
Sketches not over four straight cuts, inc. straight taper	.10
Sketches having more than four straight cuts.	.20
Plates sheared to a radius take complete circle extras.	

*Including extra for width.

Wire Rods.—Including chain rods, \$65 to \$70.

Wire Products.—Prices to jobbers effective Oct. 19: Fence wire Nos. 6 to 9, per 100 lb., terms 60 days or 2

per cent discount in 10 days, carload lots, annealed, \$2.80; galvanized, \$3.50. Galvanized barb wire and staples, \$3.70; painted, \$3. Wire nails, \$2.85. Galvanized nails, 1 in. and longer, \$2 advance over base price; shorter than 1 in., \$2.50 advance over base price. Cement-coated nails, \$2.75. Woven wire fencing, 55 per cent off list for carloads, 54 off for 1000-rod lots, 53 off for less than 1000-rod lots.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card in effect from Nov. 15, 1916, all full weight:

Butt Weld			
Steel		Iron	
Inches	Black Galv.	Inches	Black Galv.
$\frac{1}{8}$, $\frac{1}{4}$ and $\frac{3}{8}$	61 34½	$\frac{1}{8}$ and $\frac{1}{4}$	50 23
$\frac{1}{2}$	65 50½	$\frac{3}{8}$	51 24
$\frac{3}{4}$ to 3	68 54½	$\frac{1}{2}$	55 37
		$\frac{3}{4}$ to 1½	58 42
Lap Weld			
2	61 48½	1½	44 29
2½ to 6	64 51½	1½	50 36
7 to 12	61 47½	2	51 37
13 and 14	51½	2½ to 4	53 40
15	49	4½ to 6	53 40
		7 to 12	52 39
Reamed and Drifted			
1 to 3, butt.	66 52½	$\frac{3}{4}$ to 1½, butt.	53 36
2, lap	59 46½	1½, lap	39 23
2½ to 6, lap	62 49½	1½, lap	45 30
		2, lap	46 31
		2½ to 4, lap	49 34
Butt Weld, extra strong, plain ends			
$\frac{1}{8}$, $\frac{1}{4}$ and $\frac{3}{8}$	57 39½	$\frac{1}{8}$, $\frac{1}{4}$ and $\frac{3}{8}$	50 33
$\frac{1}{2}$	62 49½	$\frac{1}{2}$	55 42
$\frac{3}{4}$ to 1½	66 53½	$\frac{3}{4}$ to 1½	59 44
2 to 3	67 54½		
Lap Weld, extra strong, plain ends			
2	59 47½	1½	46 31
2½ to 4	62 50½	1½	51 37
4½ to 6	61 49½	2	53 40
7 to 12	57 43½	2½ to 4	55 43
9 to 12	52 38½	4½ to 6	54 42
		7 to 8	48 36
		9 to 12	43 31

To the large jobbing trade an additional 5 per cent is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts on less than carloads, freight to be added, effective from Nov. 1, 1916, except 3 to 4½ in. steel from Nov. 20, are as follows:

Lap-Welded Steel		Standard Charcoal Iron	
1½ in.	31	1½ in.	23
1½ and 2 in.	43	1½ and 2 in.	35
2½ in.	40	2½ in.	32
2½ and 2¾ in.	46	2½ and 2¾ in.	38
3 and 3¼ in.	46	3 and 3¼ in.	43
3½ to 4½ in.	46	3½ to 4½ in.	44
5 and 6 in.	45	5 and 6 in.	37
7 to 13 in.	42	7 to 13 in.	34

Locomotive and steamship special charcoal grades bring higher prices.

1½ in., over 18 ft., and not exceeding 22 ft., 10 per cent net extra.

2 in. and larger, over 22 ft., 10 per cent net extra.

Sheets.—Makers' prices for mill shipments on sheets of U. S. standard gage, in carload and larger lots, are as follows, 30 days net, or 2 per cent discount in 10 days:

Blue Annealed Sheets

Nos. 3 to 8	3.50 to 3.60
Nos. 9 to 12	3.15 to 3.25
Nos. 13 and 14	3.25 to 3.35
Nos. 15 and 16	3.30 to 3.40

Box Annealed Sheets, Cold Rolled

Nos. 17 to 21	3.45 to 3.55
Nos. 22 and 24	3.00 to 3.60
Nos. 25 and 26	3.55 to 3.65
No. 27	3.60 to 3.70
No. 28	3.65 to 3.75
No. 29	3.70 to 3.80
No. 30	3.80 to 3.90

Galvanized Sheets of Black Sheet Gage

Nos. 10 and 11	4.25 to 4.35
Nos. 12 to 14	4.35 to 4.45
Nos. 15 and 16	4.50 to 4.60
Nos. 17 to 21	4.65 to 4.75
Nos. 22 and 24	4.80 to 4.90
Nos. 25 and 26	4.95 to 5.05
No. 27	5.00 to 5.10
No. 28	5.25 to 5.35
No. 29	5.40 to 5.50
No. 30	5.55 to 5.65

Tin Mill Black Plate

Nos. 15 and 16	3.40 to 3.45
Nos. 17 to 21	3.45 to 3.50
Nos. 22 to 24	3.50 to 3.55
Nos. 25 to 27	3.55 to 3.60
No. 28	3.60 to 3.65
No. 29	3.65 to 3.70
No. 30	3.65 to 3.70
Nos. 30½ and 31	3.70 to 3.75

Metal Markets

The Week's Prices

Cents Per Pound for Early Delivery							
Copper, New York		Tin,	Lead		Spelter		
Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis	
Nov.	33.00	33.00	45.00	7.00	6.92½	11.75	11.50
15.....	33.00	33.00	45.12½	7.00	6.92½	12.00	11.75
16.....	33.50	33.50	45.25	7.05	6.95	12.12½	11.87½
17.....	34.00	34.00	45.25	7.05	6.95	12.25	12.00
18.....	34.00	34.00	45.12½	7.10	6.95	12.37½	12.12½
20.....	34.00	34.00	45.12½	7.15	7.00	12.50	12.25
21.....	34.00	34.00	45.12½	7.15	7.00	12.50	12.25

NEW YORK, Nov. 22, 1916

In copper a runaway market practically exists, although the demand is lighter. An exceptionally heavy business has been done in tin at higher prices. Lead has been active this week and quotations have advanced. Brass mills have bought spelter on a large scale, and the upward trend of prices has continued. Antimony is stronger, although the demand is light.

New York

Copper.—November and December copper, both Lake and electrolytic, is quoted at not less than 34c. Buying is lighter, principally because there is very little metal to be had for any of the nearby positions, and such offerings as are made are quickly snapped up if the price is at all reasonable. It is reported, but not confirmed, that Lake copper has been sold at 35c. The high prices and unusual conditions combine to make the trade nervous. Sellers would not be surprised to see prices go higher, nor would they be surprised if the market should break sharply. There is still unsatisfied demand which ordinarily would not be regarded as large, although it looms up big in view of the small supplies. Quotations have advanced even on so-called quiet days, and business has been done within a few hours at prices wide apart. On Nov. 15, early in the day, April, May and June were offered at 32c., but later other lots sold at 31c. For the same position 31.50c. was paid, and at the close 32c. was paid. On the same day some business in March, April, May and June was done at 31.30c. Persons who ordinarily are sellers were buyers. A temporary halt came over the market Nov. 16 and it has lasted more or less since, although the wire mills and other domestic consumers have done some buying. On Nov. 17 first quarter was offered at 33c., second quarter at 32c., and November and December at 34c. On Nov. 20, December alone, also January, February and March, was offered at 34c., with second quarter at 32.50c., sales being made at the latter price. This week the market has shown renewed activity. A suggestion that occurs repeatedly in the minds of the trade is that some of the large quantities of copper which were purchased for export at comparatively low prices may be offered for resale, and they do not exempt at least a part of the 448,000,000 lb. which Great Britain bought at 25.50c. Sheet copper at the mills has been advanced to 41c., base. The mid-monthly statistics showed that European stocks are steadily decreasing. The London quotation yesterday was £163 for spot electrolytic, against £152 a week ago. The exports were not exceptionally heavy this month, amounting to 13,210 tons, including yesterday.

Tin.—In the past 10 days buying of tin has been unusually heavy. Quotations are higher, but only moderately so, the price yesterday for spot Straits being 45.12½c. On Nov. 15 about 350 tons was taken and on Nov. 16 between 300 and 400 tons was sold, principally for future delivery. On Monday of this week the market was quiet until late in the day, when it took a spurt and between 400 and 500 tons changed hands, mostly for futures. Yesterday was called a quiet day, yet about 200 tons was taken by consumers. A peculiarity of the market has been that it has appeared quiet on the surface at nearly all times, even when large negotiations were under way. Obtaining permits to ship from England continues a serious question. The arrivals this month total 1275 tons and there is afloat 3852 tons.

Lead.—Until the end of last week the market was dull but strong. This week an excellent demand developed, and it has carried prices higher. Independents

ask from 7.15c. to 7.25c., New York, and 7c. and upward, St. Louis. Up to yesterday afternoon the leading interest was still quoting 7c., New York, and 6.92½c., St. Louis, but an advance is expected at any moment. It is understood that the big producer has not been selling at 7c., while outsiders have been taking business at higher levels. Prompt lead is not easy to find. The London quotation yesterday for spot lead, as compared with a week ago, was unchanged at £30 10s. The exports this month, including yesterday, are 1318 tons.

Spelter.—The brass mills have been active buyers at steadily advancing prices. Prompt prime Western was quoted yesterday at 12.50c., New York, and 12.25c., St. Louis. December was around 12.12½c., St. Louis; first quarter, 12c., and second quarter, 11.50c. Consumers are buying further into the future, sales having been made quite extensively into the second quarter and in a few cases up to October. The premium for brass mill special is higher again, now ranging about 1½c. over the price of prime Western, the premium, however, including delivery. It is repeatedly pointed out that the buying of spelter has not been proportionate to the activity in copper. No explanation is forthcoming, but the trade hesitates to believe that all of the copper bought in recent months is going into purely copper products. The exports continue heavy, amounting this month, including yesterday, to 10,587 tons. The spot quotation at London yesterday was 10s. higher than a week ago at £56 10s.

Antimony.—On the strength of the slight increase in business, quotations have been advanced about 1c., and Asiatic brands are quoted at 14c. to 14.50c.

Aluminum.—The quotation for No. 1 virgin aluminum, 98 to 99 per cent pure, is unchanged at 64c. to 66c. in large lots.

Old Metals.—The market is strong, with very heavy demand for material in some quarters. Prices show a wide variation, depending upon how badly the buyer needs metal. Stocks of old metal are very low. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible.....	28.50 to 30.50
Copper, heavy and wire.....	26.50 to 28.50
Copper, light and bottoms.....	23.50 to 25.00
Brass, heavy.....	16.50 to 19.00
Brass, light.....	13.50 to 14.50
Heavy machine composition.....	23.00 to 24.00
No. 1 yellow rod brass turnings.....	16.00 to 18.00
No. 1 red brass or composition turnings.....	17.50 to 18.75
Lead, heavy.....	6.625
Lead, tea.....	6.125
Zinc.....	8.75 to 9.25

Chicago

Nov. 20.—Continued buying of the non-ferrous metals, particularly for early delivery, adds strength to the already feverish market. Prices have been rising steadily, and advances are recorded without exception in copper, tin, lead, spelter and zinc. Prices of scrap metals are also mounting daily. We quote: Casting copper, 32.25c. to 32.50c.; Lake copper, 33.75c. to 34c.; tin, carloads, 45.50c., and small lots, 47.50c.; lead, 6.95c.; spelter, 12.25c.; sheet zinc, 18c.; Cookson's antimony, 50c.; other grades, 16c. to 17c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 27c.; copper bottoms, 23.50c.; copper clips, 26c.; red brass, 22c.; yellow brass, 18c.; lead pipe, 6c.; zinc, 8.50c.; pewter, No. 1, 25c.; tinfoil, 32c.; block tin pipe, 37c.

St. Louis

Nov. 20.—The non-ferrous metal markets have moved upward steadily the past week, with lead closing to-day at 7c. bid for carload lots and no offerings at that figure. Spelter closed strong, with 11c. to 11.50c. bid for carload lots but no sellers willing to take the offers. Prices on less than carload lots are: Lead, 7.25c.; spelter, 13.50c.; tin, 48c.; copper, 35c.; antimony, 16c. In the Joplin district zinc blende was marked up \$5 per ton, reaching a top price of \$95 for the choice ores. The average for the week for the district was \$91. Calamine was firm at \$45 to \$50, with a district average of \$48. Lead ore ranged from \$85 to \$87.50 with the average for the district \$87. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 9c.; heavy yellow brass, 12c.; heavy red brass and light copper, 17c.; heavy copper and copper wire, 10c.; zinc, 6c.; lead, 5c.; pewter, 25c.; tinfoil, 31c.; tea lead, 3.50c.

THE WORLD'S PIG-IRON OUTPUT

Production in 1915 and This Year Less Than in 1913

Despite the fact that the pig-iron output of the United States in 1916 will far exceed that of any previous year, the world's output this year will probably fall short of that for 1913, when it was over 79,000,000 tons. The 1916 total may fall between 76,000,000 and 77,000,000 tons.

A table of statistics compiled in Germany giving the world's production by countries was recently published in the London *Ironmonger*. This table is given below, except that the figures for Canada have been changed to gross tons, having been given in net tons in the original, and those for the United States and Great Britain to gross tons instead of metric:

The World's Output of Pig Iron by Countries			
	1913	1914	1915
United States	30,966,301*	23,332,244*	29,916,213*
Germany	19,309,172	14,389,547	11,790,199
Great Britain	10,481,917*	9,005,898*	8,793,659*
Three leading producers	60,757,390	46,727,689	50,500,071
France	5,311,316	5,025,000	4,750,000
Russia	4,548,396	4,261,008	3,696,560
Belgium	2,484,690	1,560,000
Austria Hungary	2,369,864	2,020,000	1,960,000
Canada	1,008,006*	699,253*	815,820*
Sweden	730,300	635,100	767,600
Italy	426,755	385,114	395,000
Spain	424,774	435,000	419,000
Other countries	550,500	495,000	480,000
Total	78,611,991	62,243,164	63,784,051

*Gross tons; others, metric tons (2204 lb.).

The figures for France are entirely a German estimate and apparently represent both occupied and unoccupied territory. Before the war, or in July, 1914, according to a French trade paper, there were 116 furnaces in blast in France, producing 420,000 tons of pig iron per month. At present the same authority states that there are 48 furnaces now operating in non-occupied territory with 8 more ready to be blown in. Their aggregate output is from 110,000 to 120,000 tons per month. It is probable that the German estimate of 4,750,000 tons as the output of blast furnaces in both occupied and unoccupied French territory is excessive.

While the 1915 world's output gained but little on that for 1914, the effect of the war is seen in the greatly reduced output in both years as compared with 1913. While in 1913 the three principal producing countries made 77 per cent of the world's total, in 1915 they furnished over 79 per cent of this total.

THE OUTPUT THIS YEAR

In estimating the 1916 output for comparison and taking the output of all the countries outside of the three leading producers as the same as in 1915, the following estimate is arrived at for 1916:

United States	39,500,000*
Germany	13,190,000
Great Britain	10,000,000*
.....	62,690,000
All other countries	13,283,000
Total	75,973,000

*Gross tons; others, metric tons.

This total is 96.6 per cent of the 1913 production. While the output for the United States this year will exceed any ever recorded, that for all the other countries is likely to show a falling off unless Great Britain should show an increase over the 1913 output.

PIG-IRON AND STEEL OUTPUT COMPARED

In connection with this analysis it is interesting to note that an outgrowth of the war's effect has been to place Germany in the same category with the United States as a greater producer of steel than of pig iron. Before the war the United States was the only country that made more steel than pig iron and this has been the record since 1911. In 1914 for the first time Germany's steel output was larger than that of pig iron but only by about 560,000 metric tons. In 1915 the difference in favor of steel was nearly 2,400,000 tons.

While in England the pig-iron output is still larger than that of steel, a decided change has taken place. In 1914 the difference between the pig-iron and steel outputs was about 1,171,000 tons in favor of pig iron but in 1915 the difference was reduced to less than 450,000 tons.

New York Shipbuilding Company Sold

The properties of the New York Shipbuilding Company have been bought by the American International Corporation, in association with the International Mercantile Marine Company, the Pacific Mail Steamship Company and W. R. Grace & Co.

The New York Shipbuilding Company owns a plant at Camden, N. J., with 160 acres of land and 4200 ft. of water front on the Delaware River. It has \$5,000,000 of stock outstanding, but the purchase involved about \$15,000,000. The present company will be liquidated and a new one formed. The principal owners were A. W. Mellon, Pittsburgh; Henry C. Frick and Henry Walters of the Atlantic Coast Line and Louisville & Nashville. S. M. Knox, now president of the company, will be elected president of the new company, and the existing organization will be kept intact.

The shipyard has a capacity of 100,000 tons per year, and contracts have been booked to handle that tonnage through 1917. The immediate construction of two shipways 150 x 1000 ft. will be undertaken. These will give an additional capacity of at least 50 per cent. Otherwise in the plant as it now stands but little change in machinery and equipment is necessary. It is expected that at least 2500 men will be added to the present force of 5000.

Orders of American Shipyards Nov. 1

Steel merchant vessels building or under contract in private American shipyards on Nov. 1, 1916, number 417 of 1,479,946 gross tons, according to builders' returns to the Bureau of Navigation, U. S. Department of Commerce. This is an increase of 25,676 tons over returns for Oct. 1. In October American yards finished 17 steel merchant ships of 52,491 gross tons and made new contracts for 17 of 77,877 gross tons. Of the 417 ships, 314 are scheduled to be launched during the fiscal year ended June 30, 1917, and 103 during the same fiscal year of 1918.

James Whalen, Port Arthur, Ont., Canada, confirms the report that he has acquired the American interests in the Western Dry Dock & Shipbuilding Company of Port Arthur. Preparations are being made for large additions to the plant. Berths will be installed sufficient to allow for the construction of four boats at one time. Not only has Mr. Whalen acquired the American controlling interests, but, in conjunction with John Burnham, Chicago, Ill., he has purchased the plant outright and it will be operated under his direct management.

The main buildings of the Sun Shipbuilding Company, Chester, Pa., have been completed and machinery is being installed. It is planned to start on the first keel about the middle of December. The foundations for the boiler shop, which will be 200 x 400 ft., will be started in the near future. The company will take good care of its employees. They will have a separate building fitted with shower baths and other conveniences, and each man will have his own locker. The plant will employ about 2000 men when in full operation.

The Ferguson Steel & Iron Company, Buffalo, N. Y., in completing the steel work of the 18-story addition to the Ten Eyck Hotel, Albany, N. Y., has put 2000 tons of steel in place in five weeks. The structural material for this building has been delivered as needed, despite the great scarcity of steel, which has interfered with the business of most large fabricators. The company was able to make immediate delivery of the steel it required because of the large stock carried in its warehouses.

Spring and Tubing Makers Consolidate

Plans for the consolidation of the Perfection Spring Company and the Standard Welding Company, Cleveland, which have been under way for some time, have been completed. They will be merged under the name of the Standard Parts Company, which will have an authorized capital stock issue of \$35,000,000. This will include \$10,000,000 of 7 per cent cumulative preferred, only half of which will be issued at present, and \$25,000,000 common, of which \$8,000,000 will be issued. Of the preferred stock, \$1,000,000 will go to the shareholders of the Perfection Spring Company and \$4,000,000 will be placed on the market. The common stock has been underwritten by a syndicate and will not be publicly offered. It is stated that the new company will be the largest maker of automobile springs in the world and one of the world's largest producers of light gage steel tubing, automobile rims, bands and bases for solid tires and bicycle and motorcycle parts. The manufacture of Perlman demountable rims will be continued under an agreement with the Perlman Rim Corporation. It is expected that Christian Girl, president Perfection Spring Company, will be the active operating head of the new company. The directorate will include Christian Girl, F. F. Prentiss, H. P. McIntosh, Sr., H. P. McIntosh, Jr., T. E. Borton and Ernest W. Farr of Cleveland and Arnold H. Goss of New York.

The net sales of the Perfection Spring Company increased from \$907,384 for the year ended June 30, 1913, to \$3,142,587 for the year ended June 30, 1916. The net sales of the Standard Welding Company increased in the same period from \$2,660,333 to \$5,123,722.

Locomotive Orders

Orders for locomotives in the past week have been 209 and inquiries for 26 have been reported. The Baldwin Locomotive Works will build 40 Mikado locomotives for the Paris, Lyons & Mediterranean Railroad and 16 Santa Fes for the Union Pacific. The American Locomotive Company will furnish the New York, Chicago & St. Louis Railroad with 25 Mikado locomotives and the Birmingham & Southern with 4 Santa Fe locomotives. The Lima Locomotive Corporation is reported to have received an order for 20 switching locomotives for the New York, Chicago & St. Louis. The Russian Government has recently placed orders for 100 decapod locomotives of which the American Locomotive Company will furnish 40, the Baldwin Locomotive Works 40 and the Canadian Locomotive Company 20. The Wabash has revived its inquiry for 25 locomotives. It is estimated that 313 locomotives were ordered in November up to and including Nov. 18, of which 165 were for export.

The Barlow Foundry Company, Newark, N. J., adjudged insolvent last May, is to be sold, by judicial authority, to four holders of preferred stock, who will purchase the plant as a going concern, provisional upon an opportunity being given to holders of common stock to participate in the reorganization. The preferred holders are Joseph M. Perrine, Jamesburg; William Fellowes Morgan, Short Hills; Walter Kidde, Montclair, and Samuel F. Dixon, Newark. The purchasers will pay the receiver, Frederick G. Smith, \$9,274, plus the expense of the receivership, and also will assume a mortgage of \$36,144.91, a second mortgage of \$1,740 and the obligations of the company totaling about \$54,190, paying all claims in full. The Barlow Foundry Company is one of the oldest in Newark. It had a capitalization of \$150,000 common stock and \$60,000 preferred. The majority of the common issue is held by Arthur E. Barlow.

The promoters of the ingot mold plant, which it was recently announced would be built at Dover, Ohio, have effected an organization under the name of the Penn Mold & Mfg. Company, which has been incorporated with a capital stock of \$200,000. It is announced that a contract has been closed with the Penn Iron & Coal Company, Dover, for the required supply of metal from its blast furnace for the manufacture of molds.

Brier Hill Buys Western Reserve

At Youngstown, Ohio, last week a deal was concluded by which the Brier Hill Steel Company will take over, about Jan. 1, the Western Reserve Steel Company, Warren, Ohio. The latter is practically a new company, having been established in May, 1914. It has \$600,000 capital stock—\$250,000 preferred and \$350,000 common. Work was begun on its plant in June, 1914, and the first output of sheets was made Jan. 4, 1915. The equipment comprises six pair and sheet furnaces, a 60-in. jobbing mill, eight hot sheet mills, four cold mills, two box annealing furnaces, two pickling machines and two galvanizing pots. The company also owns a metal lath and roofing plant, formerly operated by the Sykes Metal Lath & Roofing Company. The product is flat black and galvanized sheets, metal lath and all forms of roofing, and the annual capacity is 50,000 tons.

With the addition of the Western Reserve plant, the Brier Hill Steel Company will be one of the largest sheet manufacturers in the country, having a total of 20 hot mills. It has steadily expanded since it was organized Feb. 1, 1912. On that date the company acquired the properties of the Brier Hill Iron & Coal Company, operating Grace furnace at Youngstown; Tod blast furnace, operated by the Youngstown Steel Company at Youngstown; the Thomas Steel Company, which had a sheet mill at Niles; the Empire Iron & Steel Company, also with a sheet mill at Niles, and the Gary Iron & Steel Company, which was in the metal lathing and roofing business.

In addition to the above, the Brier Hill Steel Company has built an open-hearth steel plant with 10 90-ton furnaces and two under construction; a 40-in. 2-high reversing blooming mill, capable of taking an ingot 19 x 21 in., weighing 5800 lb., and rolling it into a bloom 7½ in. square in 13 passes; a continuous billet mill of six stands of rolls, 24-in., 2-high, and a tandem merchant mill, 16 stands, 24-in., 2-high. The company is building a Koppers by-product coke plant of 84 ovens to supply its two blast furnaces. It is strong in ore reserves, owning a 75 per cent interest in the Biwabik mine on the Mesaba Range and a half interest in the Pennington mine on the Cuyuna Range. Its coal land holdings include 800 acres of thick vein coal at Brier Hill, Fayette County, Pa.

W. A. Thomas, president Brier Hill Company, in announcing the purchase of the Western Reserve Company, made the following statement: "The plant of the Western Reserve Steel Company is most modern in every respect and exceptionally well equipped for making different sizes and highly finished sheets that are not now made by the Brier Hill Steel Company at its two plants in Niles. These additional facilities are very desirable and will put the Brier company in a position to produce everything in the sheet steel line that the trade requires."

American Tube & Stamping Changes Hands

The American Tube & Stamping Company, Bridgeport, Conn., has been sold to a group of New York capitalists, identified with large steel interests, headed by Guy P. Miller, treasurer Bridgeport Brass Company. Plans are under way for a considerable expansion of the plant and facilities, but no new products will be made. The purchasers will assume charge of the business Dec. 1. The new officers will be chosen the latter part of this month. The company now employs 1500 hands.

A contract for a large extension to its coal-handling plant at Sewalls Point near Norfolk, Va., has been placed by the Virginian Railway Company with the Wellman-Seaver-Morgan Company, Cleveland. The additional equipment will include a car dumper, with a capacity of unloading two cars at once; six transfer cars, of 120 tons capacity each, or larger than ever before built, and an elevator. The fact has developed in connection with the placing of this contract that the Virginian Railway Company plans to place in service 120-ton coal cars. The largest coal cars now in use have a maximum capacity of 100 tons.

PERSONAL

F. C. Yeates, purchasing agent of the Cambria Steel Company, has been appointed in a similar capacity for the Midvale Steel Company, the Worth Brothers Company and the Wilmington Steel Company, vice H. L. Murphey, resigned, the appointment becoming effective Nov. 20.

J. R. Holcomb has been appointed superintendent of the Wilmington Steel Company by President A. C. Dinkey to succeed W. J. Stoop, resigned.

Eli Webb, superintendent of the Pittsburgh Crucible Steel Company, Midland, Pa., has tendered his resignation, effective Dec. 1.

James A. Emery, New York, general counsel of the National Association of Manufacturers, will be the guest of honor at the annual banquet and meeting of the Wisconsin Manufacturers' Association at Milwaukee Dec. 5. Harry W. Bolens, Port Washington, Wis., president of the association, will act as toastmaster.

John G. Lapham has been appointed Eastern representative of the Grand Rapids Foundry Company, Grand Rapids, Wis., and will establish an office in New York immediately. The company specializes in the manufacture of ice-making and refrigerating machinery.

Webster J. Oliver, who for the past four years has been a member of the law firm of Oliver & McNevin, New York, has given up that connection to associate himself with Hogan & Son, steel merchants of New York and Philadelphia. For nearly ten years before taking up the law Mr. Oliver was connected with the Oliver Brothers Purchasing Company, New York and Pittsburgh.

R. E. Woodline of the accounting department of the Bethlehem plant of the Bethlehem Steel Company, has been appointed to succeed E. H. Mengel, who has resigned as cashier of the Steelton plant after twenty-five years' service. Frederick Willy has resigned as forge department foreman at Steelton, effective Dec. 1.

H. S. Kiehl, a director and assistant to B. F. Jones, president Jones & Laughlin Steel Company, Pittsburgh, has resigned after a service of twenty-one years. Mr. Kiehl will spend the winter in the South.

Louis Ruthenburg has been appointed general superintendent of the Dayton Engineering Laboratories Company, Dayton, Ohio, W. P. Anderson having resigned to go in business for himself.

Rodney Derby has joined the staff of the Snead & Co. Iron Works, Jersey City, as foundry manager, H. P. Macdonald now devoting himself to general administrative matters.

John Calder, works manager of the Remington Arms-Union Metallic Cartridge Company, Inc., Bridgeport, Conn., will sail for France on Dec. 2 on a special mission to France.

George D. Babcock, production manager, H. H. Franklin Mfg. Company, Syracuse, N. Y., has been nominated to the vice-presidency of the Taylor Society, which will hold its annual meeting in New York, Dec. 8 and 9, at the Engineering Societies Building.

Ambrose Swasey, president Warner & Swasey Company, Cleveland, and Dr. John A. Brashear, of Pittsburgh, start this week for an extended trip through China.

Tampton Aubuchon, at present manager of the East St. Louis Association of Commerce, has been chosen general manager of the Louisville Industrial Foundation. He will have charge of administration of that organization's million-dollar factory fund, and will report to Louisville late in December.

J. H. D. Eagan has associated himself with F. D. Dimmick, Land Title Building, Philadelphia. Mr. Dimmick has the Eastern agency for the Blackwood Foundry Company, Springfield, Ohio, and makes a specialty of pig iron, coal and coke; small steel castings, brass castings, and all kinds of forgings.

Fall Meeting of New Haven Engineers

The New Haven Section, American Society of Mechanical Engineers, held a meeting at the Sheffield Scientific School, Yale University, Nov. 15. At the afternoon session, held in the Hammond Laboratory, two papers were presented: "Physical Tests of Metals," by Prof. William Kent Shepard, and "Applied Metallography," by Prof. C. H. Mathewson. After a dinner at the Yale Dining Club, an evening session was held in Mason Laboratory. S. J. Berard, instructor in machine design, spoke on "Methods of Duplicating Drawings" and displayed specimens of drawings and reproductions by processes in use over a period of more than 70 years. Frank B. Gilbreth discussed "Recent Developments in Time Study Methods and Devices." The audience was much interested in some of the special cameras which Mr. Gilbreth had with him and in a short talk by John Robertson, Eastman Kodak Company, on the usefulness of small universal focus cameras.

Crucible Steel Company of America's Officers

At the organization meeting of the board of directors of the Crucible Steel Company of America, held Nov. 18, the Executive Committee and officers were elected as follows:

Executive Committee—Herbert DuPuy, chairman; C. C. Ramsey, John A. Sutton, H. S. A. Stewart, H. D. W. English, George W. Crawford and John C. Neff.

Officers—C. C. Ramsey, president; O. H. Wharton, assistant to president; John A. Sutton, first vice-president; J. W. Dougherty, second vice-president; G. W. Sargent, third vice-president; H. A. Brown, fourth vice-president; George A. Turville, treasurer and secretary; A. A. H. Niebaum, assistant treasurer; H. F. Kress, assistant treasurer and assistant secretary; N. W. Nolen, comptroller, and G. A. M. King, auditor.

Cincinnati Business Men's Club

The Business Men's Club, Cincinnati, has elected the following directors: August H. Tuechter, president Cincinnati Bickford Tool Company; Warren E. Kepplinger, president Peters Cartridge Company; Henry G. Frost, attorney, and Harry Meiss, merchant. In his annual address President George McG. Morris stated that plans for the new club house at Eighth and Race Streets have been approved and that it was hoped to have work started at an early date. Addresses were made by Senator Lawrence Y. Sherman of Illinois, and Mayor George Puchta of Cincinnati, who were guests of honor at the banquet.

Pittsburgh Foundrymen's Association

The regular monthly meeting of the Pittsburgh Foundrymen's Association was held in the Fort Pitt Hotel, Pittsburgh, on Monday evening, Nov. 20, preceded by a dinner. H. Cole Estep, associate editor of *The Foundry*, gave an address, illustrated with lantern slides, on "The Solution of Cleaning Room Problems and the Use of Sand Blast in Modern Foundries." This is practically the same address that he gave in September at the convention of the American Foundrymen's Association in Cleveland.

The Northwest Steel Company, Portland, Ore., is preparing a rolling mill, according to J. W. Bowles, president of the company. The proposed enterprise will require an expenditure of \$1,000,000 and will provide a plant with a monthly capacity of 15,000 to 20,000 tons of steel plates and other products.

David Milne, 2580 Bowker Avenue, Victoria, British Columbia, proposes to establish a rolling mill in South Vancouver, to cost \$150,000. The City Council has granted him certain concessions.

Hickman, Williams & Co., pig iron, coal and coke, have moved their offices from the Pennsylvania Building to suite 901, Morris Building, Philadelphia.

Pittsburgh and Nearby Districts

While the Amalgamated Association scale fixing wages in bar-iron mills that sign that scale does not run over 2c. per lb. for bar iron, puddlers will receive 25c. per ton advance in wages for each advance of 5c. in the bar-iron price. Wages for puddling recently fixed for November and December on a 2c. card gave puddlers \$9.55 per ton for boiling, but, should the next settlement be at 2.05c., puddlers will receive \$9.80.

The Youngstown Sheet & Tube Company is preparing a plot of ground in East Youngstown, near its mills, to be used for playground purposes.

E. E. Erskine, an attorney of Steubenville, Ohio, states that the project that he and others had under way for the building of a new steel plant at Toronto, Ohio, has been abandoned on account of the result of the Presidential election.

Niles blast furnace of the Carnegie Steel Company, Niles, Ohio, was banked several days last week for lack of coke.

The annual meeting of stockholders of the Standard Underground Cable Company, Pittsburgh, will be held Jan. 23, 1917, at which time it is proposed to ask the stockholders to authorize an increase in the capital of the company, which at present is \$3,500,000. The amount of the proposed increase has not as yet been definitely settled by the board of directors.

The Chemical Refractories Company, Youngstown, Ohio, has been organized with a capital of \$10,000 to engage in the manufacture of chemicals for industrial purposes.

The Steel City Construction Company, Pittsburgh, capital \$5,000, has been incorporated by O. M. Lewellyn, Greensburg, Pa.; A. Waldbauer and I. C. Overdorff, Pittsburgh, for general contracting and building construction.

The Stimson-Kennedy Company, Pittsburgh, capital \$20,000, has been incorporated by Robert Stimson, Charles F. Mautz and Henry L. Dietrich, for manufacturing plumbing, drainage, gas lighting and heating supplies.

The Sistersville Boiler Works, Sistersville, W. Va., is in the market for two 10-ton cranes, 50-ft. span, and one 5-ton crane, with 30-ft. span, all hand operated. These are to be installed in a fireproof building, 100 x 110 ft., with lean-to, 30 x 100 ft., to be erected this winter.

The report that the Brier Hill Steel Company, Youngstown, will build additional by-product coke ovens after the 84 ovens now building are completed, is officially denied.

The Marshall Foundry Company, Pittsburgh, has placed an order with the Cleveland Crane & Engineering Company, Wickliffe, Ohio, for two 20-ton cranes to be installed in its plant at Josephine, Pa. The Pittsburgh Crucible Steel Company has placed an order with the same crane company for one 25-ton crane to be installed in its open-hearth steel plant at Midland, Pa.

The Rodney Pierce Optical Company, Pittsburgh, capital \$50,000, has been incorporated by Rodney and George R. Pierce, Pittsburgh, and Walter G. King, New York, for manufacturing optical goods, scientific instruments, etc.

The Philadelphia Company, Pittsburgh, and its subsidiaries, the Equitable Gas Company and the Monongahela Natural Gas Company, have notified industrial consumers of natural gas that their contracts will be terminated at midnight, Nov. 30. These companies now quote rates for gas on the basis of 27½c. per 1000 cu. ft. for the first 1,000,000 cu. ft. of consumption per month, ranging down to 17c. per 1000 cu. ft., which is the minimum price for any quantity. It is understood that they desire industrial consumers to equip themselves for using other kinds of fuel so as to conserve the supply of natural gas for domestic consumers who pay much higher rates.

The Westinghouse Electric & Mfg. Company, East Pittsburgh, has extended its bonus system to include salaried and office employees on hourly rates. They will receive a bonus of 8 per cent of their salary each month,

providing their total excusable time absent and late during the month does not exceed six hours, incurred on not over three occasions. An additional 4 per cent will be given each month to the employee who has not lost any time through absence or tardiness, thus enabling those affected to obtain an increase in earnings of 12 per cent for a 100 per cent attendance. Several thousand employees of the company in the Pittsburgh district will be benefited.

Carnegie Day will be observed by the trustees and faculty of the Carnegie Institute of Technology, Pittsburgh, on Friday, Nov. 24. An exhibition of student work and of the equipment and buildings will be held from 3 to 5 and from 7.30 to 10.30 p. m. in connection with the observance of the 81st birthday of Andrew Carnegie, the founder of the institution.

Furnace No. 4 of the Shenango Furnace Company, Sharpsville, Pa., which was blown in on Sunday, Nov. 12, was completely relined, bosh and hearth enlarged, and other improvements made, in 24 days, and not six weeks, as stated in THE IRON AGE last week. It was only out from Oct. 19 to Nov. 12. This is certainly a wonderful record for rapid work. It was blown in on basic iron, and is expected to make about 325 tons per day.

The Bessemer Gas Engine Company, Grove City, Pa., has let a contract to the Duquesne Construction Company, Pittsburgh, for an extension, 100 x 200 ft., to its engine assembling and erecting floor, and also for an entirely new machine shop 100 x 200 ft. It has also ordered from the Penn Bridge Company, Beaver Falls, Pa., an addition of 60 x 100 ft. to its present foundry, and will erect an entirely new core-making room, 80 x 120 ft., to be equipped with a 5-ton crane; also a pattern shop and a pattern storage room, each 60 x 120 ft. All the new buildings will be of steel and reinforced concrete, with saw-tooth roofing. The additions will greatly enlarge the capacity of the company in the manufacture of gas and oil engines.

The Hydraulic Press Mfg. Company, Mount Gilead, Ohio, has received an order from the Goodyear Tire & Rubber Company, Akron, Ohio, for 70 hydraulic hot-plate presses, all of one design, and with a pressure capacity of 115 tons each.

The Standard Steel Car Company, Butler, Pa., of which A. N. Fay is purchasing agent, states that the loss occasioned by the recent fire in its power and electrical departments was greatly overstated. The damaged portions of the plant have been repaired, new tools have been bought to replace those crippled by the fire, and the entire plant is now working to normal capacity.

The Pittsburgh Iron & Steel Foundries Company, Midland, Pa., maker of ingot molds, being oversold, has placed an open order with the Edgewater Steel Company, Oakmont, Pa., for 150 tons of steel ingot molds per day.

The Engineering Library in New York

Dr. James Douglas of New York has presented \$100,000 to the United Engineering Society, the income to be used for the benefit of the library, which occupies two floors in the Engineering Societies Building in New York. The trustees of the society have perfected plans for the development and the extension of the usefulness of the library and are endeavoring to secure endowments aggregating \$1,000,000, the income to be used for the library. The plans of the trustees having been submitted to and examined by Dr. Douglas, he signified his approval by the gift of \$100,000. Now that the library of the American Society of Civil Engineers has been united with the libraries of the institutes of Mining, Mechanical and Electrical Engineers the combined library forms, it is stated, the greatest engineering collection in the world.

The Hart-Parr Company, Charles City, Iowa, will build a new steel foundry, to be equipped with two additional 25-ton open-hearth furnaces. The new construction will cost \$100,000 and will bring the company's steel capacity up to 200 tons a day.

Judicial Decisions

ABSTRACTED BY A. L. H. STREET

AUTHORITY OF TRAVELING SALESMEN.—Except as the employer of a traveling salesman or sales representative may have expressly or impliedly held him out to customers as being authorized to do so, the salesman has no authority to receive payment of amounts due from customers for goods sold on credit. Customers are not entitled to rely upon the salesman's statements as to the extent of his authority, and they act at their peril in dealing with him without ascertaining the full scope of his authority. The fact that an agent by whom property has been sold on credit is in possession of the statement of account covering such goods gives him no implied power to collect. And when it appears that a salesman has unauthorizedly made a collection and failed to account for it, the loss falls on the customer who made the payment. (Washington Supreme Court, *Woodworth vs. School District*, 159 Pacific Reporter, 757.)

RIGHTS OF PREFERRED STOCKHOLDERS.—Holders of preferred stock in a New Jersey corporation having delayed three years in objecting to a plan for the reduction of the capital stock of the company by retiring the preferred stock, and the plan having been adopted by more than 90 per cent of the stockholders, and debentures having been issued on the supposition of the validity of the reduction, the right to object was lost. (New Jersey Court of Errors and Appeals, *Lazear vs. American Steel Foundries*, 98 Atlantic Reporter, 642.)

DUTY TO PROVIDE CARS FOR F. O. B. SHIPMENTS.—In deciding that a contract to sell goods f.o.b. car at point of shipment placed the duty on the seller to furnish the necessary car, in the absence of agreement to the contrary, the New Mexico Supreme Court follows decisions of the highest courts of Alabama, Kansas, Washington and Wisconsin to the same effect. But the court notes that a contrary rule has been declared by the Pennsylvania Supreme Court, and that the Illinois Supreme Court has declared it to be an undecided question in Illinois. (Culp vs. Sandoval, 159 Pacific Reporter, 956.)

EXCLUSIVE SALES AGENCIES AND ANTI-TRUST LAWS.—The Kansas anti-trust law is not violated by an agreement whereby a local dealer is made sole agent for the sale of a manufacturer's machinery in his territory. (Kansas Supreme Court, *Zellner Mercantile Company vs. Parlin & Orendorff Plow Company*, 159 Pacific Reporter, 391.)

THE INCOME TAX LAW AND EXPORTS.—Corporations engaged in doing an export business are not entitled to a deduction from their income, in computing income taxes, on account of profits accruing from exportation of goods to foreign countries, on the ground that such taxation amounts to a tax upon exports in violation of the federal constitution. "Obviously, general taxation on production may discourage exports, yet that gives no relief as to articles intended for foreign parts. By the same reasoning, profits or income from exports should be taxable, because subsequent to the act of export. Income or profit presupposes a successfully completed transport. It is no part of the act of exportation, though it may be said to be a result thereof. Similarly the fact that taxation of the fruits of exportation may discourage business quite as much as anticipatory taxation on the goods transported is immaterial." (United States District Court, Southern District of New York, *Wm. E. Peck & Co. vs. Lowe*, 234 Federal Reporter, 125.)

EMPLOYER NOT BOUND TO INSPECT SIMPLE TOOLS.—The obligation of an employer to cause to be made reasonable inspection of machinery and appliances which may injure workmen if in defective condition does not extend to such simple tools as hammers and mauls. (Wisconsin Supreme Court, *Kolasinski vs. Chicago, Milwaukee & St. Paul Railway Company*, 159 Northwestern Reporter, 563.)

EXAMINATION OF TRADEMARK INFRINGER'S BOOKS.—In determining the amount of damages to be awarded

for infringement of a trademark, plaintiff is not entitled to inspect the defendant's books, not in evidence, and in advance of the final hearing, for the purpose of ascertaining therefrom the names and addresses of defendant's customers to whom sales of infringing articles have been made, when such information might be used to the commercial prejudice of the defendant. But this does not mean that production of the books might not be compelled at the trial if necessary to show the damages resulting from the infringement. (United States District Court, Eastern District of Pennsylvania, *Cushman & Denison Manufacturing Company vs. L. F. Grammes & Sons*, 234 Federal Reporter, 949.)

WAIVER OF RIGHTS UNDER PATENT INFRINGEMENT.—Where an owner of a patent, knowing of its infringement through continued manufacture and sale of a conflicting device, waited several years before suing for an accounting, he lost the right to recover possible profits or damages for that period. (United States District Court, Southern District of New York, *Vacuum Cleaner Company vs. Innovation Electric Company*, 234 Federal Reporter, 942.)

PRIORITY OF RIGHTS UNDER CONDITIONAL SALE CONTRACTS.—On failure to record a contract for sale of machinery, or other personal property, under which the seller has reserved title until payment of the purchase price, his rights are subordinate to those of any third person who may afterward buy the property or take a mortgage thereon, in good faith and without notice of the seller's attempted reservation of title. But the rights of the seller are paramount to those of one who took a contract from the buyer, before the conditional sale contract was made, under which a lien was given on property to be acquired by the buyer in the future. (United States Circuit Court of Appeals, Eighth Circuit, *United States Fidelity & Guaranty Company vs. G. W. Parsons Company*, 235 Federal Reporter, 114.)

WARRANTY OF MACHINERY'S CAPACITY NOT WAIVED.—The fact that a buyer of a refrigerating machine gave the seller a written statement that the machine conformed to the specifications under which it had been sold, after it had been installed and operated by the seller's engineer for two days, did not release a warranty, made by the seller as part of the contract of sale, that the machine would have a certain refrigerating capacity. (Michigan Supreme Court, *Brown vs. Pendergast*, 159 Northwestern Reporter, 541.)

EFFECT OF WARRANTY IN SELLING FURNACE.—A manufacturer having sold a furnace for use in a steam power plant under agreement that the buyer should give it 30 days' trial and that, if the furnace should not prevent emission of smoke to the satisfaction of the city smoke department, the manufacturer would remove it, the burden was on him, in an action to recover the agreed price after the buyer refused to finally accept the equipment, to show that the city smoke department approved it. The duty being on the selling manufacturer to remove the furnace on its failing to meet the conditions of the contract, and the buyer having ordered him to remove it, the buyer's continued use of the furnace pending its removal did not waive the right to reject it, especially since operation of the buyer's plant would otherwise be interfered with. (Iowa Supreme Court, *McMillan vs. Jaeger Manufacturing Company*, 159 Northwestern Reporter, 208.)

VIOLATION OF PATENT LICENSE AS INFRINGEMENT.—The owner of a patent may sell or authorize others to sell the patented article without limitation as to price, time, or place, or he may limit his licensees as to price, time or locality. Any sale beyond the terms of the license is an infringement. (United States Circuit Court of Appeals, Fourth Circuit, *L. E. Waterman Company vs. Kline*, 234 Federal Reporter, 891.)

WHEN THERE IS NO PATENTABLE INVENTION.—The dividing of a thing, which in the prior art was whole, into parts, or the making of a part removable, which was previously irremovable, does not constitute patentable invention. (United States District Court, District of New Jersey, *Wirtalla vs. Hall*, 235 Federal Reporter, 306.)

Iron and Industrial Stocks

NEW YORK, Nov. 22, 1916.

The stock market has been furiously active, with prices of numerous industrial securities advancing to new high records. The advances in some instances have been due to rumors of impending consolidations, while in others they have been simply brought about by reports of large profits and of further bookings of attractive contracts. The usual warnings are being given to speculators by conservative banking interests, but the disposition of the public to purchase stocks is persistent. In striking contrast to the course of other stocks, Driggs-Seabury fell on Friday from 80 to 69, recovering to 80 on Saturday. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week is as follows:

Allis-Chalm., com., 31½-33½	Int. Harv. of N. J.,
Allis-Chalm., pref., 89-91	pref., 120-120
Am. Can. com., 63½-67½	Int. Harv. Corp.,
Am. Can. pref., 113½-114½	com., 79½-80½
Am. Car & Fdy.,	Int. Harv. Corp.,
com., 68½-77½	pref., 111½-111½
Am. Car & Fdy.,	La Belle Iron,
pref., 117-117½	com., 80½-94½
Am. Loco., com., 92½-95½	La Belle Iron,
Am. Loco., pref., 107½-108½	pref., 132½-133
Am. Ship. com., 66½-70	Lacka. Steel., 96½-107
Am. Ship. pref., 95-96	Lake Sup. Corp., 25½-29½
Am. Steel Fdries., 65½-72½	Midvale Steel., 68½-74½
Bald. Loco., com., 83½-89	Nat. En. & Stm.,
Bald. Loco., pref., 107½-108½	com., 33½-36
Beth. Steel., com., 648-700	Nat. En. & Stm.,
Beth. Steel., pref., 155-186	pref., 100-100½
Cambria Steel., 130-135	N. Y. Air Brake., 170-186
Carbon Stl., com., 128-133	Pitts. Steel. pref., 103-104½
Case (J. I.), pref., 86½-89	Pressed Stl., com., 78½-88½
Central Fdy.,	Pressed Stl., pref., 105½-108
com., 18-21	Ry. Stl. Spring,
Central Fdy.,	com., 53½-58½
pref., 32-40½	Ry. Stl. Spring,
Chic. Pneum. Tool., 71-73	pref., 102-102½
Colo. Fuel., 53½-61½	Republic, com., 83-93
Cruc. Steel., com., 87½-93½	Republic, pref., 115-117
Cruc. Steel., pref., 120½-123½	Sloss, com., 80½-93½
Deere & Co., pref., 94½-95	Sloss, pref., 101½-103½
Driggs-Seabury., 69-86	Un. Alloy Steel., 49½-51½
Gen. Electric., 180-185½	U. S. Pipe, com., 25-28½
Gt. No. Ore Cert., 42½-47½	U. S. Pipe, pref., 65-67½
Gulf States Steel., 144-193	U. S. Steel, com., 121½-129
Gulf States Steel.,	U. S. Steel, pref., 121-122½
1st pref., 105-108½	Va. L. & C. Coke., 58½-72½
Gulf States Steel.,	Warwick, 9½-10
2nd pref., 140-190	Westing. Elec., 63½-66½
Int. Harv. of N. J.,	
com., 117-117½	

Dividends

The Republic Iron & Steel Company, regular quarterly, 1½ per cent on the preferred stock, in addition to 4 per cent in full payment of arrears on that stock, both payable Jan. 1.

The General Electric Company, regular quarterly, 2 per cent, payable Jan. 15.

The Crucible Steel Company of America, regular quarterly, 1½ per cent on the preferred stock, and an extra of 1¼ per cent on back dividends, payable Dec. 21. This leaves 18½ per cent still due in dividends on the preferred stock.

Fairbanks, Morse & Co., Ltd., regular quarterly, 1½ per cent on the preferred stock, payable Dec. 1.

The Gulf States Steel Company, regular quarterly, 1¼ per cent on the first preferred stock, payable Jan. 1.

The Harbison-Walker Refractories Company, regular quarterly, 1½ per cent on the preferred stock, payable Jan. 20.

The Maxwell Motors Corporation, regular quarterly, 2½ per cent on the common stock, 1¼ per cent on the second preferred and 1¼ per cent on the first preferred, all payable Jan. 2.

The National Lead Company, regular quarterly, 1 per cent on the common stock, payable Dec. 30.

The Pressed Steel Car Company, regular quarterly, 1½ per cent on the common stock, payable Dec. 6, and 1¼ per cent on the preferred stock, payable Nov. 22.

The Columbia Steel & Shafting Company, Pittsburgh, has established a branch sales office at 803 Widener Building, Philadelphia, which is in charge of J. T. Somers, as district manager of sales. Mr. Somers has had charge of sales in the Eastern territory for several years, but has made his headquarters at the general offices of the company at Pittsburgh.

The Midwest Forge & Steel Company, with works at East St. Louis, Ill., and general offices in the Wright Building, St. Louis, announces the purchase of the Heller Forge Works and the Western Forge Company, East St. Louis, which were founded 25 years ago. This company claims to operate the largest steam forge hammers in the Middle West.

Scandinavian and Russian Trade Service

George Schow, conducting a foreign trade service bureau as accredited representative for Europe for American manufacturers, with headquarters at Christiania, Norway, has consolidated his Russian and Scandinavian interests with the Northern Engineering & Trading Company, increasing the capital to 1,500,000 crowns. The headquarters will continue at Christiania. The president of the company will be Halfdan Steen-Hansen and F. Morch-Reiersen, Jr., will be managing director of the Norwegian office. A branch in Petrograd, Russia, will be in charge of Fedor Andrejevitch Byström, and branches at Moscow and Samara, Russia, will be in charge of Kort Köpke. A branch in Stockholm, Sweden, will be under the charge of Capt. Erik Cronvall. A branch in Copenhagen, Denmark, will be established in the near future. The office in New York City is in charge of Ingvar Tokstad, president of the Normanna Company, Inc., 117 East Eighteenth Street, who is also secretary of the Norwegian-American Chamber of Commerce at New York. Mr. Schow will be the general manager of agencies for all the countries referred to and will spend much of his time traveling and working in connection with the branch offices.

Machinists' Strikes in New York and New Jersey

The strikes for an eight-hour day, involving machinists in 50 metal-working plants in New York City, Jersey City, Newark, Hoboken and Elizabeth, brought at various times in the past year have, with few exceptions, been broken through the efforts of the New York and New Jersey branch of the National Metal Trades Association. At present two important strikes are still on in the New York district. The boilermakers, iron ship builders and helpers of the Morse Dry Dock & Repair Company are demanding the recognition of their union. Of the 500 workmen who have gone out 200 have been replaced. Shipyard work is on an eight-hour basis with three shifts. The Bartlett & Haywood Company, Baltimore, erecting tanks in Brooklyn, is opposing 300 members of the Brotherhood of Boilermakers and Iron Ship Builders on the question of an advance from \$4.50 to \$5 a day.

Becker Milling Machine Company Sold

The Becker Milling Machine Company, Hyde Park, Mass., has been acquired by the Manufacturers' Company at a price reported to be \$2,000,000. Robert E. Herrick succeeds Eugene N. Foss as president. This adds another concern to the "Herrick Group," in which the Reed-Prentice Company and the Wyman-Gordon Company, Worcester, Mass., are included. It is understood that no changes will be made in the operating force.

Record Exports of Locomotives

Exports of steam locomotives from the United States for the period ended Aug. 31, 1916, were 432, or 54 per month, the total value being \$6,192,000. The rate in 1915 was 52 per month, with a total of 621. The previous record was in 1913, when 491 were exported. In July and August this year 62 and 69 locomotives were shipped abroad.

In the opening of the wireless telegraph service between the United States and Japan, the American Steel Export Company sent a message to its Tokio agents, Aall & Co. This was the first to follow the official greetings, it is understood, and was itself congratulatory, reading: "Marconi's latest triumph inaugurates new era in interchange of commodities and ideas between our nations instituted by illustrious Perry."

The National Enameling & Stamping Company's new rolling mill at Granite City, Ill., begins operations this week, turning out both light and heavy sheets and bars for outside consumption as well as for company use. For the present the company will absorb about 50 per cent of the output and the remainder has been contracted for by a large equipment company.

Machinery Markets and News of the Works

FEW LARGE ORDERS BOOKED

Italian and Spanish Interests Buying

Harroun Motors Company Placing Orders in Detroit—Russians Figuring on Tools for Agricultural Implement Plant

The general tenor of trade is unchanged, with activity largely confined to booking orders which are small individually, although here and there some reasonably large transactions are noted. In Detroit large orders are being placed by the Harroun Motors Company for its new plant, greatly augmenting the smaller purchasing in that city.

Representatives of the Aksai Machinery Works of Russia, who are planning the purchase of a huge amount of machinery for manufacturing farm implements and machinery, have lately been in Milwaukee investigating the plant equipment question. The deliveries will be contingent on the ending of the war.

Cincinnati reports that Spanish and Italian interests have been extensive buyers recently, one order for shipment to Spain calling for a large number of small lathes. The domestic business is good in that city but no large orders are recorded.

The new demand for small lots is heavy in the aggregate in Cleveland. Lathes and milling and planing machines are especially active. The New York Central Lines are in the market for half a dozen tools.

Buying for shipment to Italy has been fairly active in New York, also, the buyers figuring closely and showing a willingness to wait for deliveries. As a rule deliveries are improving, although on the majority of tools they are still a goodly distance away.

The Pusey & Jones Company, Wilmington, Del., is placing orders for about \$75,000 worth of equipment.

The Eastern trade has received the Norfolk & Western list. Several machines have been placed by the Lehigh Valley Railroad.

In the Pacific Northwest the car shortage threatens to paralyze the lumber industry, and this has an adverse effect on all lines in that territory. In San Francisco the demand for new equipment appears to be growing easier.

In Canada attention is being directed to the agricultural implement needs of Russia and Siberia.

New York

NEW YORK, Nov. 22, 1916.

With few exceptions individual sales are not large, but orders for one or more machines are being received steadily, and inquiries are numerous. Some good sales of miscellaneous tools have been made for export to Italy, the buyers figuring closely and in most cases being willing to wait for deliveries on the tools they want.

Deliveries on shaping, grinding, milling, planing and automatic screw machines, radial drills and boring mills are still a few months away with practically all makers, but hand screw machines, lathes and upright drills can be obtained on

reasonably prompt delivery. Some large turret lathes require until January, others can be had more promptly. Some makes of boring mills require fully six months for delivery. Upright drills, while easily obtainable, are in excellent demand.

The New York trade is in receipt of the Norfolk & Western list calling for about 35 machines, which was referred to in the Cleveland market last week. The Lehigh Valley Railroad continues to buy.

The export inquiry for 500 turret lathes referred to a week ago is for flat turret machines.

Pusey & Jones, Wilmington, Del., are buying against a list of tools valued at about \$75,000.

The F. H. Lovell Company, Arlington, N. J., is buying equipment to be used in filling a United States Government contract.

The Nathan Mfg. Company will use its new plant at Flushing, L. I., for the manufacture of its locomotive specialties, continuing its fuse work at the plant in Manhattan Borough.

The Warner & Swasey Company, Cleveland, Ohio, has had a representative in the East looking for planers, hand millers and engine lathes which can be delivered promptly.

The Steelwhite Company has been incorporated with a capital stock of \$200,000 and has purchased a site at Jamestown, N. Y., adjoining the plant of the Interior Metal Mfg. Company, where it plans to erect a factory, 100 x 163 ft., for the manufacture of metal kitchen cabinets, tables and special hospital equipment. It is expected to have the plant in operation early next year. Otho M. Otte, treasurer and general manager of the Interior Metal Mfg. Company, will be at the operating head of the new organization. The company controls a process of welding non-ferrous metals to ferrous metals, which will be utilized in covering steel tops, tables, etc. The plant will be equipped with motor-driven machines throughout, and the work will be done by assembling on traveling benches. Among the Pittsburgh capitalists who have become interested in the company are Julian Burdick, treasurer West Penn Steel Company; James Lippincott, president West Penn Steel Company, and James W. Arrott, Jr., director of the Standard Sanitary Mfg. Company. General sales offices are to be established in Pittsburgh.

The American Car & Foundry Company, 165 Broadway, New York, will spend \$150,000 enlarging its plant at Milton, Pa. This is the second increase in capacity to this plant within a year. A car-finishing shop is just being completed. The proposed improvement will be a car building shop, 100 x 400 ft., a foundry, and additions to other main buildings. New machinery will be added, which will practically increase the present output of tank cars and tanks 50 per cent. It is stated that this plant, as it now stands, has by far the largest capacity for work of this kind of any plant in the world.

Recent increases in capital stock have been reported by the Secretary of State, Albany, as follows: The Solar Metal Products Company, 1182 Broadway, New York, \$200,000 to \$400,000; the Modern Tool & Machine Works, 176 Worth Street, New York, \$10,000 to \$20,000; the Improved Metal Cap Specialty Company, 337 Sumner Avenue, Brooklyn, N. Y., \$15,000 to \$75,000; the Frank D. Ward Automatic Machine Corporation, 17 Battery Place, New York, \$10,000 to \$25,000.

The Doehler Die Casting Company, Court and Ninth streets, Brooklyn, N. Y., has awarded contract to the Turner Construction Company, 11 Broadway, New York, for a seven-story addition to its plant, 50 x 100 ft., to cost about \$150,000.

Gould & Eberhardt, Newark, N. J., manufacturers of shapers and other machinery and tools, have awarded a contract for the erection of a new plant on Chancellor Avenue, Irvington, N. J., at a cost of \$225,600. Frank H. Smith, Inc., Blanchard Street, Newark, is the contractor.

The Joseph Dixon Crucible Company, 135 West Side Avenue, Jersey City, N. J., will make alterations and extensions in its plant to cost \$11,000.

J. J. O'Connor Company, Inc., 1 Exchange Place, Jersey City, N. J., has been incorporated with a capital of \$100,000 to manufacture barrels and kindred products. R. F. Norton, A. E. Pettersen and John A. Warnock are the incorporators.

The Motor Steam Generator Company, Atlantic City, N. J., has been incorporated to manufacture devices for internal

combustion engines. Charles W. Evans and Robert J. Eccles are the incorporators.

The Stoneware Electric Stove Company, Dover, N. J., has been incorporated with a capital of \$50,000 to manufacture electric stoves and heating devices. Arthur O. Christensen and John L. Sullivan, Dover, and William Taylor, Plainfield, are the incorporators.

The Kent Motors Corporation, 1790 Broadway, New York, has approved plans for its new plant to be erected on Washington Avenue, Belleville, N. J. The plant will specialize in the manufacture of bodies and radiators for touring cars and roadsters, and will have a capacity of about 10,000 cars a year. Employment will be given to about 2000 men. Additional property has been secured for future expansion.

The Nonpareil Auto Car Mfg. Company, Glens Falls, N. Y., has filed articles of incorporation to manufacture motor cars, etc. A. Sansoucy, P. Freund, Troy, N. Y., and N. Favreau, Cohoes, N. Y., are the incorporators. The capital stock is \$30,000.

The United Motors Corporation, Detroit, Alexander P. Sloan, president, has acquired the Houk Mfg. Company, Buffalo, maker of wire wheels for automobiles, and additional investments will be expended by the purchasing company at an early date on extensions and equipment at the Houk plant, more than doubling its present capacity. Under the terms of transfer of the Houk Mfg. Company, George W. Houk, the organizer of that company, will be retained as its president and general manager, and will also become a member of the board of directors of the United Motors Corporation.

The Union Tool Company, Rochester, N. Y., is erecting a factory on North Street, 50 x 120 ft.

Arrangements are being made for the rebuilding of the plant of the Phoenix Foundry Company, Voorheesville, N. Y., recently destroyed by fire.

The International Burr Corporation, Watertown, N. Y., has been incorporated with a capital stock of \$25,000 to manufacture burrs and paper. F. H. Clark, W. Aiken and A. H. Rector, Watertown, are the incorporators.

Plans have been completed for a two-story factory to be erected at Court and Jay streets, Binghamton, N. Y., by W. E. Ogden & Co., at an estimated cost of \$35,000.

The Model Furniture Mfg. Company, Inc., Canlsteo, N. Y., has been incorporated with a capital stock of \$40,000. A. Mann, Canlsteo, and A. M. Rabinovic, 303 West 111th Street, and D. Mann, 509 West 160th Street, New York City, are the incorporators.

The Smith & Sons' Company, manufacturer of hairpins, etc., Lambertville, N. J., has purchased the plant of the Buffalo Veneer Company, Buffalo, N. Y., a three-story stone factory, 80 x 200 ft., at Main Street and the Erie Railroad and will equip it for the manufacture of its products.

The House Wire Wheel Company, D. S. Morgan Building, Buffalo, N. Y., recently incorporated, is making arrangements for the erection of a plant for the manufacture of wire wheels for automobiles, on a site recently acquired.

The Gleason Works, Rochester, N. Y., has let contract to the Ferguson Steel & Iron Company, Buffalo, for construction of a one-story addition to its plant on University Avenue.

The Geneva Cutlery Company, Geneva, N. Y., has let contract for an addition to its plant.

The Buffalo Dry Dock Company will build a two-story reinforced concrete warehouse and shop at its plant on Buffalo River, Ganson Street and the Buffalo Creek Terminal Railroad, Buffalo.

The American Radiator Company will build a further addition to its Pierce Plant at Elmwood Avenue and the New York Central Railroad, Buffalo, to cost about \$27,000.

The Nichols & Wright Motor Company, Buffalo, manufacturer of motors and engines for automobiles and motor boats, will build a new factory, of concrete block construction, on Park Ridge Avenue.

The Blaw Steel Construction Company, 165 Broadway, New York, has been awarded the contract to erect a 1½-story brick and steel factory, 50 x 280 ft., at Shooters Island, for the Standard Shipbuilding Company, 44 Whitehall Street, New York.

Frederick W. Korfmann, 409 Ninth Avenue, Long Island City, N. Y., is preparing plans for alterations to the six one-story warehouses and the two brick boiler houses at the foot of Blackwell Street, for the Astoria Veneer Mills & Dock Company, estimated to cost \$25,000.

F. J. Ashfield, 350 Fulton Street, Brooklyn, N. Y., has completed plans for the addition to the one-story boiler house, at Driggs Avenue and North Tenth Street, for the Williamsburg Power Company, to cost about \$3,000.

New England

BOSTON, MASS., Nov. 20, 1916.

Although the embargo on the New Haven Lines has been partially lifted so that less than carload lots originating in New England can be moved, the railroad situation is still serious. On Oct. 23 there were 46,878 cars on this system, but on Nov. 9 the number had risen to 50,008, nearly the total registered during the embargo days of a few months ago.

The New Haven Malleable Iron Company, New Haven, Conn., has been organized with \$50,000 capital paid in. Charles M. Brennan is president; W. F. Brennan, vice-president, and Edward P. Brennan, secretary.

The Terry Steam Turbine Company, Hartford, Conn., is having built an addition, 20 x 125 ft., one story, to be used as a stockroom.

The Acme Wire Company, New Haven, Conn., has increased its capital stock from \$500,000 to \$1,500,000.

The Schroeder Brothers Mfg. Company, Torrington, Conn., has awarded a contract for an addition, 40 x 43 ft., two stories.

The Knox Motor Company, Springfield, Mass., will begin at once the manufacture of an aeroplane engine invented by Frank H. Trego, its chief engineer. It is reported to be the largest aeroplane engine in the world, weighing fully equipped 1400 lb. and developing over 300 hp. The engine is also adaptable for motor boats.

The American Chain Company, Bridgeport, Conn., is erecting an addition, 50 x 75 ft., three stories, to its office building.

The Waterbury Farrel Foundry & Machine Company, Waterbury, Conn., has awarded the contract for the erection of two factory buildings at Bank and Meadow streets: One 40 x 180 ft., two stories; the other, 35 x 150 ft., one story.

The Berbecker & Rowland Mfg. Company, Waterville, Conn., is to build an office building, 40 x 40 ft., three stories.

The Baush Machine Tool Company, Springfield, Mass., has developed a Berthier machine gun in both water-cooled and air-cooled models which will be entered in the competition to be conducted next spring at the Springfield Armory for the final selection of a gun for the United States Army. The original Berthier gun was a Belgian invention and its manufacture had just been begun when the European war broke out. When Liege fell, the four guns which had been made and the plans were removed in safety and the designs were subsequently sold to an American company.

The Scovill Mfg. Company, Waterbury, Conn., has awarded a contract for an addition, 16 x 144 ft., one story, to its factory on Hamilton Avenue.

The New England Westinghouse Company, Springfield, Mass., is building an addition, 29 x 32 ft., four stories, to its plant on Page Boulevard.

The Bela Body Company, Boston, Mass., has been incorporated with capital stock of \$800,000. The directors are Lowell Hunt, president; Norman B. French, 128 Fuller Street, Brookline, treasurer, and George C. Shea.

The Baldwin Chain Company, Worcester, Mass., has awarded a contract for an addition, 35 x 52 ft., one story, to be used as an annealing plant.

The United Electric Light & Waterbury Company, Waterbury, Conn., has announced that it is to build at Devon, Conn., a power plant which will generate current for light and power for much of the Naugatuck Valley. It is estimated that the total cost will be over \$1,000,000.

The New England Drawn Steel Company, Mansfield, Mass., has been incorporated with capital stock of \$210,000. The directors are William B. McSkimmon, president; Clifford L. Lyall, Melfose, treasurer, and H. Griffith.

The Hartford Machine Gun Company, Hartford, Conn., has been incorporated with capital stock of \$100,000. The incorporators are E. Henry Hyde, Hartford, and William C. Hungerford, New Britain, and Theodora Ellsworth of Windsor. The real owners as well as the plans of the company have not been divulged.

The Eastern Motors Company, Hartford, Conn., has been organized with capital of \$675,000. Willis D. Upson of Waterbury holds 6744 shares of the stock issued.

The Beach Mfg. Company, New Haven, Conn., has been incorporated with capital stock of \$500,000. The incorporators are Harry G. Day, Thomas M. Stele and W. J. Beach. The present output of the company, which is now operating in a small way, is mechanical toys, but it is understood that it will later build aeroplanes and will manufacture military and naval equipment and ordnance.

The Ideal Mfg. Company, New Haven, Conn., which was taken over some time ago by the Marlin Arms Corporation, has been purchased from that company by Phineas M. Tal-

cott of Hartford. The Ideal Mfg. Company has taken quarters in the Sheldon Building and will manufacture reloading tools.

The Bridgeport Steel Company, Stratford, Conn., will begin business with capital of \$50,000. George Windsor is president and treasurer; W. H. Leonori, vice-president, and B. A. Scrymser, secretary.

The Champion Horse Shoe Company, Providence, R. I., has increased its capital stock from \$200,000 to \$300,000.

The Locomobile Company, Bridgeport, Conn., is asking bids on a factory, 100 x 160 ft., one story.

Harvey Hubbell, Inc., Bridgeport, Conn., has awarded a contract for an addition, 30 x 90 ft., one story.

The Franklin Machine Company, Providence, R. I., will extend its foundry by additions, 34 x 98 ft. and 56 x 140 ft.

The Greenfield Machine Company, Greenfield, Mass., has awarded a contract for an addition, 50 x 100 ft., one story.

The American Steel & Wire Company, North Works, Worcester, Mass., has awarded a contract for an addition, 50 x 191 ft., one story.

Philadelphia

PHILADELPHIA, Pa., Nov. 20, 1916.

The Pennsylvania Equipment Company, Coleman Building, Philadelphia, is in the market for a second-hand 30-ton locomotive crane.

The Cyclone Mfg. Company, Bradford, Pa., formerly manufacturer of stationary and portable vacuum cleaners, has discontinued that line and will hereafter do general light contract work.

The Edward G. Budd Mfg. Company, maker of sheet-steel shapes, etc., Philadelphia, advises that the account given in some quarters that it is erecting a building of six acres for the Budd Wheel Corporation, is entirely erroneous. It is erecting buildings, which when completed will comprise approximately 6 acres of floor space, but this is in the development of its own business, and is not being erected exclusively for the Budd Wheel Corporation, which will occupy only a small part of these buildings. William B. Read is secretary.

The Lozier Brothers Company, Widener Building, Philadelphia, has filed incorporation papers in Delaware with a capital of \$10,000,000, to manufacture automobiles. It is announced that a plant will be erected near Philadelphia with an initial cost of about \$2,500,000 for the manufacture of automobiles. Harry A. Lozier, former president of the Lozier Motor Car Company and the H. A. Lozier Company, Cleveland, is head of the new company. Engineering offices are being maintained at Cleveland.

The Pennsylvania Flexible Metallic Tubing Company, Philadelphia, will build a one-story tube shop, about 45 x 107 ft., at Seventy-third Street and Elmwood Avenue.

The Philadelphia Screen Mfg. Company, Philadelphia, will build an addition to its machine shop at Fifty-sixth Street and Paschall Avenue.

The Philadelphia Enameling Mfg. Company, Philadelphia, which recently awarded a contract for the erection of a plant on Eighty-second Street, has filed articles of incorporation at Dover, Del., with a capital of \$500,000. William E. Groll, L. Groll, East Lansdowne, Pa., and Lewis J. Matthias, Philadelphia, are the incorporators.

John H. Ferguson, Philadelphia, has awarded a contract to H. Reusswick for the erection of a one-story machine shop, 36 x 150 ft., at Broad Street and Hunting Park, at a cost of \$10,000.

The L. H. Gilmer Company, Philadelphia, manufacturer of belting, will build a two-story, steel and concrete addition, 50 x 160 ft., on Keystone Street, Tacony.

The Quaker City Drop Forge Company, 229 Market Street, Camden, N. J., has been incorporated with a capital of \$150,000 to manufacture drop forgings. Alfred J. Genner, Luther Marsh and William L. Layre, are the incorporators.

Fire Nov. 17, destroyed a part of the plant of the Camden Curtain Rod Company, Broadway and Jackson Street, Camden, N. J., with loss estimated at \$18,000. M. O. Phillips is the general manager.

The Crossley Machine Company, State and Monmouth streets, Trenton, N. J., manufacturer of clay and rubber working machinery, has acquired the plant now occupied by the Electric Porcelain & Mfg. Company, Monmouth Street, as an addition to its present factory.

The Electric Porcelain & Mfg. Company, Monmouth Street, Trenton, N. J., manufacturer of electrical porcelain specialties, has acquired the plant formerly occupied by the Climax Pottery Company, New York Avenue and a tract of adjoining property. The company will make immediate alterations

in the existing structures and remove its plant to the new site. Plans are now being prepared for an addition, 130 x 150 ft., to cost about \$70,000, to be commenced early next year. H. T. Paiste, Philadelphia, is president; H. S. Yearsley is treasurer.

The Lippincott Motor Car Company, Camden, N. J., has leased a new garage to be erected by Kennedy & Pidcock, Inc., Trenton, on South Broad Street, Trenton, at a cost of \$10,000. The structure will be about 50 x 100 ft., and is to be fully equipped for commercial work.

The Gasco Mfg. Company, Lancaster, Pa., has been organized to establish a plant for the manufacture of specialties for automobiles, including heaters and dashlights. R. W. Shreiver is president.

The Columbia Thermometer Works, Columbia, Pa., has been organized to operate a plant for the manufacture of thermometers. J. E. Blakeman is manager.

Fire, Nov. 14, destroyed the blacksmith shop and boiler plant of the Oil Well Supply Company, Bradford, Pa., with a loss estimated at \$50,000.

The McManus Contracting Company, Philadelphia, has been incorporated with a capital of \$25,000 by Patricius, Joseph A. and George O. McManus, 3512 Baring Street, and George F. Snyder, 1210 North Eighteenth Street, Philadelphia, to do general construction and contract work.

The Everett Motor Company, Everett, Pa., has been incorporated with a capital stock of \$20,000 by James A. Sweet, Saxton, Pa., H. Frank Gump, Jr., J. Grant Hanks, Frank Howard, W. Scott Rinedollar and Lesley Blackburn, Everett, Pa., to repair automobiles, etc.

The Colonial Foundry & Machine Company, York, Pa., has been incorporated with a capital stock of \$20,000 by James A. Constantine, Columbia, Pa., J. E. Baker and George R. Shenberger, York, to conduct a general steel, iron and brass foundry and manufacture machinery.

Capitalized at \$40,000, the Wilkes-Barre Structural Steel Company, Wilkes-Barre, Pa., has been incorporated by Harry A. Feindt, 34 John Street, Dorranceton, Pa.; James P. Carnody, 53 Vaughn Street, Dorranceton, Pa., and Michael F. McDonald, 6 Brown Street, Hanover, to design, fabricate and erect steel structures.

The Shawinigan Electro-Products Company, U. S. Fidelity & Guaranty Building, Baltimore, plans the addition of another unit to its plant in Highlandtown, Md.

The Pulaski Foundry & Mfg. Corporation, Pulaski, Va., will increase its capital stock from \$25,000 to \$50,000, and will succeed the Pulaski Foundry & Machine Company. It advises that all additional equipment planned has been purchased. Robert Bunts, Jr., is president.

The Hughes Foulkrod Company, Commonwealth Building, Philadelphia, has been awarded contract for constructing a one-story brick boiler house, 45 x 46 ft., for the Enduro Mfg. Company, Sixty-third and Eastwick streets, Philadelphia, to cost \$7,500.

Chicago

CHICAGO, ILL., Nov. 20, 1916.

The Pullman Company, Chicago, concerning whose intent to buy largely of new equipment mention has already been made, has taken out a permit providing for the erection of a machine shop to cost \$220,000. It will be of two-story construction, 130 x 240 ft.

The Linde Air Products Company, Forty-second Street Building, New York, is proceeding with the erection of its proposed one-story manufacturing plant at 3633 Wall Street, Chicago.

The Kling Brothers Engineering Works, 1302 Kingsbury Street, Chicago, will build a one-story power house to cost \$4,000.

C. Jensen, 644 North Avers Street, Chicago, is building a one-story shop at 3847 West Chicago Avenue at a cost of \$5,500. Contracts have been let.

The Universal Portland Cement Company, Chicago, has completed plans providing for the substantial enlargement of its plant at Buffington, Ind.

John Mohr & Sons, boiler makers, Chicago, suffered a loss estimated at \$115,000 from fire which practically destroyed its shop on West Illinois Street.

The Central Manufacturing District, Chicago, has prepared plans for the development of a new industrial section, the project calling for the building of a large number of factories, power plants and other facilities.

The Armed Vise Company, Muscatine, Iowa, has been organized by J. M. O'Brien and U. G. Bond, who will build

a factory for the manufacture of acetylene welding and soldering appliances.

The H. L. Collins Company, St. Paul, Minn., will build a one-story brick factory on Myrtle Avenue in that city at a cost of \$4,500.

The Wege Concrete Machinery Company, St. Paul, Minn., has been incorporated by A. J. Kroeger, E. F. Wege and C. H. Edwards and will build a plant for the manufacture of machinery to produce concrete products estimated to cost \$150,000. It is expected to be ready for occupancy about Jan. 1 next.

The Northern Pacific Railroad has begun work on an addition to its shop at Northtown Junction, Minn., on which about \$25,000 will be expended.

D. D. Rullman, 1804 Lathrop Street, St. Joseph, Mo., manufacturer of washing machines, will remove his business to Omaha, Neb., where a factory is about to be erected.

The Albaugh-Dover Company, Chicago, manufacturer of gears, etc., will build a plant at Norfolk, Neb., for the manufacture of farm tractors, for which an investment of \$40,000 for buildings and \$60,000 for equipment is planned.

The E. H. Sprague Mfg. Company, 606 South Fourteenth Street, Omaha, Neb., has been incorporated to manufacture automobile accessories. It has taken over the plant of the Standard Foundry Company of that city.

The Hutchinson Foundry & Machine Works Company, Hutchinson, Kan., is building an addition to its shop, 30 x 100 ft.

The St. Joseph Structural Steel Company, St. Joseph, Mo., T. W. Dodd, president, is building additions to its plant which will approximately double its capacity.

Detroit

DETROIT, MICH., Nov. 20, 1916.

The activity in the machinery market has been augmented by large orders placed by the Harroun Motors Company for its new plant at Wayne, Mich. Numerous small orders have kept the market very active and jobbers all report a big fall business. The delivery on small machines has bettered considerably, but the higher priced machines, particularly grinding and milling machines, still require from 3 to 6 months for delivery.

The Federal Motor Truck Company, Detroit, is erecting an addition to its factory and installing additional machinery. Another machinery building and assembling plant will be constructed immediately. M. L. Pulcher is general manager.

Work on the construction of a factory for the Universal Valveless Four-Cycle Motor Company, a new industry at Muskegon, Mich., will be started soon. The company is incorporated for \$250,000 by Muskegon and Grand Rapids capitalists. I. A. Anderson is the patentee of its product.

The L. M. H. Development Company has been capitalized at \$30,000 by Clarence Martin, Jackson, Mich., John Hurlburt, Detroit, and H. M. Leonard, former chief engineer of the Duplex-Power Car Company at Charlotte, Mich., to manufacture a four-wheel-drive tractor. It is the invention of Mr. Leonard, who is now in Charlotte, arranging for the construction of tractors for demonstration purposes.

The Superior Steel Castings Company, Benton Harbor, Mich., whose plant will open Dec. 1, has received orders for castings and gear casing from the United States Government for the construction of torpedo boat destroyers. Orders have been booked for two years ahead, and additional buildings will be erected as the business requires.

It is reported that the Cadillac Machine Company, Cadillac, Mich., is installing new machinery because of its increased business, due to war orders.

The Cadillac Motor Car Company has purchased approximately 50 acres of land on the west side of Scotten Avenue, just off of Michigan Avenue in Detroit, for the erection of a new factory. The land is reported to have cost \$750,000 and the new factory building which will be erected will increase the total investment to about \$2,000,000 and furnish employment to from 10,000 to 12,000 persons. H. M. Leland is president of the company, which is a subsidiary to the General Motors Company.

The Bay City Foundry & Machine Company, which recently purchased the foundry and machine shops of the M. Garland Company at Bay City, has increased its business to such an extent that an addition is being constructed to its plant.

The Port Huron Construction Company, Port Huron, Mich., has been merged with the Monroe Motor Company of Pontiac, Mich. R. F. Monroe is president of the reorganized company, and Sidney E. Jenks of Port Huron has been se-

lected as vice-president. It will continue to operate the Port Huron plant of the Port Huron Construction Company.

A new corporation, to be known as the Allegan Steel Process Company, has been organized at Allegan, Mich., with a \$30,000 capitalization, and plans the immediate erection of a factory building. The business of the company will be the hardening of steel by heat treatment, and the forging and smithing of steel. The equipment is now being ordered. The principal officers of the company are located at Allegan, and the new building is expected to be completed Jan. 1.

The Blood Brothers Machinery Company, Allegan, Mich., reports the closing of an order for \$70,000 worth of universal joints, to be delivered within the next 6 months. The company will immediately order additional machinery, which will enable it by early spring to double its output.

The Williams aeroplane factory, Fenton, Mich., will shortly install machinery, looking for contracts to supply machines to the United States Government.

Milwaukee

MILWAUKEE, WIS., Nov. 20, 1916.

Officials of the Aksai Machinery Works, a large Russian implement and farm machinery interest, were in Milwaukee last week on a tour of Middle Western machine-tool centers, with a view to placing orders, it was stated, for \$4,000,000 worth of equipment. In the party were B. I. Avilov, president of the company; V. I. Forsbloom, chief engineer, and B. M. Sverdlhoff, manager of the commercial department. In a published interview, Mr. Avilov is quoted as saying that the intention is to contract with lathe and milling machine builders for at least 800 tools, for delivery as soon as possible. The tools, however, are intended for commercial operations at the close of the war rather than for immediate use in the production of munitions of war. Shops in this district were found sold up to the last notch for several months ahead, some as far as July 1 and Aug. 1. Any orders to be placed by the Aksai Works will go through the New York offices of the tool builders, consequently no actual transactions are noted here.

Little headway in the direction of catching up on deliveries on domestic business is being made, because of the steady demand. Business continues to be in single tools or small lots, and large-lot buying is almost entirely absent. This condition has prevailed for a number of months and is regarded as satisfactory. The release of unskilled labor from seasonal occupations has worked only slightly to the advantage of the metal-working industry, which wants skilled workmen urgently. The last report of the Wisconsin free employment bureau says the demand for boys of 16 to 18 is greater than the supply. These boys formerly worked on munitions, doing piece work, at which they earned \$2.50 to \$3. This work now is letting up, and it is a hard task to get them to work for \$5 or \$10 a week. It is still harder, the report says, to get them to learn a regular trade.

The Western Malleable Company, Beaver Dam, Wis., has resumed partial operations in the South Center Street plant, one of its group of three foundries, two of which have been working at capacity for some time. The shortage of foundry labor, however, has made it possible to man only one furnace in the third works, although orders available greatly exceed the capacity of the group.

The West Milwaukee shops of the Chicago, Milwaukee & St. Paul Railway Company at Milwaukee are building 50 freight cars daily, and on Dec. 15 will start work on an order issued by its Chicago headquarters on Nov. 15 for 1250 ore and coal cars costing approximately \$1,750,000. A. E. Manchester is in charge.

The Smith & Reading Furnace Company has been incorporated with a capital stock of \$5,000 by Anthony V. Smith, Gustaf A. Reading and Winifred M. Reading.

The Four Wheel Drive Automobile Company, Clintonville, Wis., is erecting a brick warehouse, 40 x 100 ft., for the storage of its rough castings.

The Mitchell Motors Company, Racine, Wis., will build from 1000 to 1500 ft. of loading sidetracks on both the North-Western and Milwaukee railroads, making a total of nearly four miles of sidings at its plant.

The new branch plant of the Joliet Bridge & Iron Company, Joliet, Ill., at DePere, Wis., formerly the Lyons Boiler Works, is already shipping its first product, a large tank for a rubber manufacturer at Akron, Ohio.

W. Heck & Son, Wewaupee, Wis., have opened a general machinery repair shop and garage at Antigo, Wis., and are installing lathes, milling machine, drill press, welding and cutting unit, etc.

The water and light commission, Plymouth, Wis., is taking sealed bids until 8 p. m., Nov. 24, for a single stage short belt drive air compressor, a single stage centrifugal pump of

1050 gal. per min. capacity, a mixed pressure steam turbine of 100 b. hp., condensers, etc. The consulting engineer is the Thomas S. Watson Company, 1412 Majestic Building, Milwaukee. H. A. Luedtke is city clerk.

The Federal Malleable Company, 299 Sixty-fourth Avenue, West Allis, Wis., has increased its capital stock from \$250,000 to \$300,000 to accommodate its increased business and to cover the extension of facilities made this year. O. L. Hollister is president and C. R. Messinger is secretary.

The Universal Indicator Company, Milwaukee, manufacturing electrical voting and similar indicating devices, has increased its capital stock from \$100,000 to \$500,000. The company has large contracts for installing voting systems in State legislative bodies and in the capitol of the United States. B. L. Bobroff is vice-president and chief engineer.

The Foster Construction Company, Caswell Block, Milwaukee, has taken the general contract for erecting a group of buildings for the Coats & Tweed Mining Company of Duluth, Minn., at Verona, Mich., including a central heating plant, a machine shop, smithy, power house, etc., at a cost of between \$175,000 and \$200,000.

The Anger Engineering Company, 301-303 Sixteenth Street, Milwaukee, will close bids Nov. 26 for the erection of its new machine shop and garage, 120 x 130 ft., one story and basement.

The International Steel Products Company, Milwaukee, has been incorporated with a capital stock of \$150,000 by Henry W. Gottschalk, E. Krause and G. F. Knoernschild. The promoters are not ready to announce their plans.

The Keller Pneumatic Tool Company, Fond du Lac, Wis., is having plans prepared by the Werner-Bradfield-Mead Company, Grand Rapids, Mich., for its proposed new plant at Muskegon, Mich. It will be 100 x 300 ft., one story and basement, and work will be undertaken next spring.

Cleveland

CLEVELAND, OHIO, NOV. 20, 1916.

New demand for small lots of machine tools is heavy, particularly for lathes, milling and boring machines. The call for lathes is largely for equipment adapted for very exacting work. The demand for boring machines is coming to a considerable extent from tire manufacturers at Akron. Considerable business that would be placed were manufacturers able to make reasonable deliveries, is being withheld. Cleveland machinery houses are getting a good volume of business from Detroit. The Burroughs Adding Machine Company placed an order with a local machinery house for \$52,000 worth of screw machines and the Studebaker Corporation has practically placed an order with the same company for 40 turret lathes. Among purchasers of considerable equipment in the past few days are the Warner & Swasey Company, Cleveland, and the Morgan Engineering Company, Alliance, Ohio. The McMyler-Interstate Company, Bedford, Ohio, is in the market for 8 or 9 machines, including lathes, boring and shaping machines. Inquiry from the railroads has improved. The New York Central Lines are in the market for about a half dozen machines, including car wheel boring machines, axle lathes and wheel presses. An inquiry is pending from the Chicago, Milwaukee & St. Paul Railroad for several wood-working machines.

Plants engaged in building sugar-making machinery are filling orders for 1917 delivery and some orders for equipment for 1918 have been placed recently. The demand for locomotive cranes is very heavy and manufacturers are getting enough domestic business to keep them busy without taking export orders. A local forge shop is booking considerable foreign business, mostly in car forgings. The demand on some foundries for castings has eased up a bit because of the usual between season letup in orders from automobile manufacturers. Early in the year, when foundries were seriously handicapped by the scarcity of unskilled workmen, a great deal of colored labor was brought to northern Ohio foundries from the South. This class of labor as a general thing proved unsatisfactory, and few of these colored men are now to be found in Cleveland foundries.

The Enterprise Tool Company has taken space in a power building on East Seventy-second Street near St. Clair Avenue, Cleveland, and is installing machinery which is expected to be placed in operation about Dec. 1. It will specialize on tool work. F. J. Whitcomb is manager.

The United States Molding Machine Company, Cleveland, has increased its capital stock from \$10,000 to \$60,000 to provide additional capital for the growth of its business. No plant extensions are contemplated.

The Ferro Machine & Foundry Company, Cleveland, has increased its capital stock from \$850,000 to \$1,000,000.

The Titanic Mfg. & Machine Company, Cleveland, has been incorporated with a capital stock of \$10,000 by Walter J. Schmidt and others to manufacture metal products.

The Standard Oil Company, Cleveland, has applied for a permit to erect a factory building, 80 x 275 ft., at a cost of \$175,000.

The National Carbon Company, Cleveland, has acquired 65 acres of land near its plant on Berea Road, on which it plans ultimately to erect additional factory buildings.

The Sandusky Forge Company, Sandusky, Ohio, has been incorporated with a capital stock of \$300,000 and will establish a plant in the building formerly occupied by the Peoples Cement Company. It is stated that equipment, including 22 hammers and accessories, was purchased in Indianapolis several months ago and will be moved to Sandusky. The officers are: President, J. Barrows, Jamestown, N. Y.; vice-president, M. C. Crow, president Crow-Elkhart Motor Company, Elkhart, Ind.; secretary and treasurer, W. H. Collier, Painesville, Ohio.

The Ney Mfg. Company, Canton, Ohio, will enlarge its plant by the erection of a three-story brick building, 35 x 85 ft.

The Myers Rubber Company, Cuyahoga Falls, Ohio, will move to Massillon, Ohio, where it has started the erection of a plant, 62 x 120 ft., to manufacture automobile tires and rubber accessories. E. H. Hachtel is president.

It is announced that a new plant will be established in Toledo, Ohio, by the Saxon Mfg. Company, for the manufacture of automobile accessories. Herman Saxon has resigned as vice-president and factory manager of the Electric Auto Lite Company, Toledo, to take charge of the new industry.

The Hibbard-Atwood Company, Toledo, has been incorporated with a capital stock of \$20,000 to manufacture refrigerating equipment. Harry W. Hibbard and Charles G. Atwood are prominent in the organization.

Indianapolis

INDIANAPOLIS, IND., NOV. 20, 1916.

The Elkhart Carriage & Motor Car Company, Elkhart, Ind., has increased its capital stock from \$100,000 to \$300,000.

The H. & M. Auto Parts Company, Cambridge City, Ind., has been incorporated with \$10,000 capital stock to manufacture automobile parts. The directors are O. E. and Alpheus Huddleston and C. J. Marson.

The Washington Plow Company, Washington, Ind., has been incorporated with \$50,000 capital stock to manufacture plows and agricultural implements. M. H. Kelly, E. G. Gesell and C. K. Tharp are the directors.

The Terre Haute Handle Company, Terre Haute, Ind., has increased its capital stock from \$12,500 to \$25,000.

The Shelter Wood Rim Mfg. Company, Portland, Ind., has been incorporated with \$35,000 capital stock to manufacture steering wheel rims for automobiles. The directors are Alonzo F. Bowers, Carl M. Bimel and Edward M. Haynes. Plans for a plant are under way.

Cincinnati

CINCINNATI, OHIO, NOV. 20, 1916.

A good-sized order for lathes was received from Spain last week, and as they are of the smaller sizes, it is evident that they will not be used in munitions manufacturing. It is stated that both Spain and Italy have been lately buying more machine tools than ever before. Quite a large number of portable electric drilling machines are also being shipped to those countries. The Russian demand has dropped off, due to the inability to make direct shipments at this time of the year. French buyers of machine tools have lately been in the market, but no large orders have been reported. The domestic inquiry is good, but only a scattered lot of orders has been booked. On account of the rapidly advancing prices on pig iron with a consequent increase in the cost of castings, it does not seem at all unlikely that builders of these machines will be compelled to advance prices at an early date.

Wood-working machinery is in better demand, and makers of oil mill equipment in this vicinity report a very good outlook for next year. Manufacturers of engineering specialties have been compelled to advance prices all along the line on account of the high cost of raw materials.

The Oesterlein Machine Tool Company, Cincinnati, has temporarily decided not to construct a new plant, as was recently announced. It has leased part of the former Belmar Machine Tool Company's plant in West End and is fitting it up for making its line of grinding machines. The present Spring Grove Avenue factory will be devoted almost entirely to building milling machines.

J. Huesman, Cincinnati, will construct a plant on Spring Grove Avenue, in the Camp Washington district, to be fitted

up for general jobbing machine work and for the construction of special machine tools.

The K. D. Lamp Company, Cincinnati, recently organized by H. R. Kerans and others, has leased a five-story factory building at 108-110 West Third Street, that will be fitted up for the manufacture of automobile lamps and other accessories.

Klein & Cohn, Cincinnati, scrap iron merchants, will remove their plant to a site secured in West End, and will install additional yard equipment at the new location.

The Graves & Marshall Company, Dayton, Ohio, boiler manufacturer, is fitting up a new plant on East Monument Avenue that will more than double its present capacity.

It is currently reported that the Stevens Mfg. Company, Dayton, Ohio, contemplates making still further additions to its manufacturing facilities. Details as to the extra equipment required are lacking. The company makes a specialty of dies, jigs and machine screw products.

The Kelly-Springfield Road Roller Company, Springfield, Ohio, has been consolidated with the Buffalo Steam Roller Company, Buffalo, N. Y., and the name of the new organization has been changed to the Buffalo-Springfield Road Roller Company. It is rumored that the Springfield plant will be extended.

The Western Construction Company, Columbus, Ohio, has been incorporated with \$15,000 capital stock to manufacture road-building machines. R. J. Reynolds is one of the principal incorporators. Nothing has been given out as to the company's machinery requirements.

The Goodyear Metallic Rubber Company is fitting up a branch plant at Columbus, Ohio, that will be used for the manufacture of tennis shoes and other specialties.

London, Ohio, contemplates adding two generating units to its electric lighting plant.

The Dayton Malleable Iron Company, Dayton, Ohio, which recently purchased a foundry at Ironton, Ohio, intends to erect a large addition to the latter plant at an early date.

The Central South

LOUISVILLE, KY., Nov. 20, 1916.

Relief measures have been effective in a marked degree in meeting the car shortage situation which this part of the country has been laboring under and the iron and machinery trade is noting a better feeling as a consequence. An increased activity is noted in the development of coal lands. Many inquiries relating to water and lighting plant projects are being received. The demand for motors continues brisk.

The Thomson Milling Company, Louisville, Ky., has been incorporated with capital stock of \$100,000 by W. A. Thomson, W. A. Thomson, Jr., and Keith L. Bullitt.

The J. L. Strassel Company, Louisville, Ky., has purchased the wood-working plant of the Wolke Furniture Company, Louisville, for \$13,000, and proposes to improve and operate it.

The Paducah Ice Company, Paducah, Ky., will liquidate and re-organize, proposing to establish a larger plant and operate on an extended scale.

The Love Foundry & Machine Company, Winchester, Ky., has been incorporated with capital stock of \$10,000 by James Love, Winchester; J. C. Hey and L. B. Patterson, Cincinnati, Ohio. Mr. Love will be general manager. The company will make improvements to its plant.

The plant of the General Refractories Company, New York, located at Olive Hill, Ky., which was destroyed by fire with loss of \$100,000, will be rebuilt.

Construction of the oil refinery of the Melick Refining Company, near Lexington, Ky., will begin next March, according to announcement by David L. Melick. It is estimated to cost \$2,500,000.

Charles G. Frazier, New York City, and others are reported to be negotiating for purchase of shipyards plants on the Ohio River, to include the Howard Shipyards at Jeffersonville, Ind., and the Paducah Marine Ways, at Paducah, Ky. A steel fabricating plant would be established at Paducah, it is stated.

The Washington Plow Company will be incorporated at Washington, Ind., to take over the William H. Clore Mfg. Company's plow factory there, recently purchased for \$40,500 by Mrs. Marie H. Kelly. C. K. Tharp, Egbert Gasell and Mrs. Kelly will be the incorporators.

The Paris Lumber Company, Paris, Tenn., was destroyed by fire with a loss of \$15,000. C. M. Williams was principal owner.

The Robert R. Nixon Company, Chattanooga, Tenn., is asking for dealers' prices on a second-hand air compressor, capacity 1200 cu. ft., 100 to 125-lb. pressure, power drive

connected to 220-volt or 440-volt three-phase 60-cycle alternating current motor; recent model of the feather-valve type preferred.

J. R. Kinder formerly sales manager of the Eclipse Stove Company, Mansfield, Ohio, has completed the organization of the Simplex Farm Ditcher Company, Owensboro, Ky., which has been incorporated with a capital stock of \$250,000 to manufacture farm ditchers. Mr. Kinder will be secretary and general manager.

Birmingham

BIRMINGHAM, ALA., Nov. 20 1916.

Conversion of steam driven plants into hydroelectric units continues on a broad scale resulting in a steady and large demand for electrical apparatus. The Alabama graphite field locates new plants almost every week and that establishes another demand for electrical equipment. Wholesale machinery dealers report trade excellent in all quarters.

The Kirby Lumber Company, Houston, Tex., has purchased 17,000 acres of timber land in Walton and Holmes Counties, Florida, and will manufacture crossties for the New York Central Railroad.

The Atlantic Paper & Pulp Company, Port Wentworth, Ga., has been organized with I. H. Fetty of Savannah, president, to manufacture pulp and paper. It has a capital stock of \$1,500,000 and proposes to build a plant with a daily capacity of 50 tons.

The Newport Turpentine & Rosin Company, Milwaukee, Wis., has increased its capital stock from \$100,000 to \$350,000 and will erect at Pensacola, Fla., a plant costing \$400,000. C. H. Turner & Co., Pensacola, have been awarded the contract for the buildings.

St. Louis

ST. LOUIS, MO., Nov. 20, 1916.

Buying of machine tools continues very free with the total running well up to recent high levels. A number of large purchasers have been in the market the past week, among them the Fulton Iron Works, which bought considerable equipment, including a large Gray planing machine. The tendency generally is still to negotiate transactions rather than to send out lists for bids and in consequence the real volume of business is rarely fully ascertainable. Dealers are held back now only by delayed delivery. Price and character of equipment are a secondary consideration. No interference in business on new tools by second-hand equipment is noticeable. Collections are very good and both commercial and investment money is readily available.

The Liquid Carbonic Company, St. Louis, Mo., has leased a five-story factory to which it will remove and install additional equipment for the manufacture of carbonic gas, fountain fixtures, carbonizing machinery, etc. A quantity of new machinery will be bought at once.

The Central Iron Company, St. Louis, Mo., has acquired a new site and will equip a shearing plant. Louis Ladins is president.

Harry Newman, Inc., St. Louis, Mo., has been organized with a capital stock of \$10,000 by Charles F. Levy, Samuel V. and Harry Newmah to manufacture automobile accessories.

The forgings plant recently noted to be erected by the Fulton Iron Works of St. Louis, Mo., will be operated as an independent corporation, in which the Fulton Iron Works will be interested. The total investment will be about \$500,000.

The Wagner Electric Mfg. Company, St. Louis, Mo., will erect a building to add to the capacity of its Wellston plant. It will be five stories with 140,000 sq. ft. floor area and will be equipped to manufacture standard electrical products.

The Bean Spray Pump Company, San Jose, Cal., has been authorized to do business in Missouri, employing a portion of its capital in a plant to be established at Kansas City.

The West Automatic Injector Company, Kansas City, Mo., has been incorporated with a capital stock of \$40,000 by Charles E. West, J. H. Arnold and J. H. Dobbins to manufacture steam injectors and kindred apparatus.

The Benson Automatic Speed Signal Company, Kansas City, Mo., has been incorporated with a capital stock of \$100,000 by E. M. Todd, C. R. Francisco and O. M. West to manufacture safety devices and signals.

Slater, Mo., is receiving bids on 350-hp. water-tube boilers for a minimum working pressure of 160 lb. per square inch. J. A. Stern is city clerk.

The Kansas City Light & Power Company, Kansas City, Mo., will build a power plant reported to cost about \$3,000,000. Plans are being prepared. John H. Lucas is president.

The Prairie Light & Development Company, Little Rock, Ark., has been incorporated with a capital stock of \$500,000 by S. R. Morgan, Little Rock; J. P. Perkins, St. Louis, and P. O. Lehn, Chicago, and will equip a plant to furnish electric power for nearby gins, mills, etc.

The North American Light & Power Company, 122 South Michigan Avenue, Chicago, will establish an electric light plant and ice making plant at Durant, Okla., the machinery to cost about \$18,000. W. A. Boehn is president.

Stroud, Okla., will change its electric light plant from direct to alternating current. It is in the market for one 75-kw. generator and pump of 250 gal. per minute capacity, one Diesel oil engine, etc.

The Missouri, Kansas & Texas Railway will equip at Muskogee, Okla., a 15-stall roundhouse, machine shop, automatic coaling station, etc. The chief engineer at Dallas, Tex., will have charge.

Garages and machine shops will be equipped by Dodd Brothers, at Delaware, Okla., M. Mortenson at Fairfax, Okla., R. J. Hausman at Hennessey, Okla., and by Simmons & Snider at Jenks, Okla.

The Cloco Gasoline Company, Tulsa, Okla., has been incorporated with a capital stock of \$100,000 by H. F. Bethman, E. R. Perry and H. A. Gibson to equip a refining plant.

The Tulsa Gas-O Refining Company, Tulsa, Okla., has been incorporated with a capital stock of \$600,000 by John B. Enfield, Tulsa, W. R. Southworth, Canton, and J. L. Hughes, Enid, Okla., to operate an oil refinery.

Marlow, Okla., E. B. Roper, city clerk, is receiving bids until Dec. 4 on one 250-hp. engine, one 130-kv. 2300-volt 60-cycle three-phase alternating current generator, etc.

Okmulgee, Okla., will receive bids for an electrically driven pump of 1100 gal. per minute capacity.

The plant of the Central Cotton Oil Company, Jackson, Miss., which has been burned with a loss of \$15,000, will be re-established.

Columbus, Miss., will erect and equip an electric light plant to cost \$50,000.

H. L. McLean, of the Algiers Railway & Light Company, New Orleans, La., together with other capitalists, has plans for the equipment of a steel car building plant.

The Wray-Dickinson Company, Shreveport, La., G. D. Wray, president, will erect a garage and machine shop to cost \$50,000.

Vinton, La., will spend \$20,000 on waterworks equipment, including a rotary pump, a crude oil or distillate engine, etc. T. H. Mandel, Lake Charles, La., is the engineer in charge.

San Francisco

SAN FRANCISCO, CAL., NOV. 14, 1916.

The demand for metal-working tools appears to be slackening, as orders have been placed covering principal improvements contemplated, and manufacturers are now awaiting deliveries. Capacity operations, however, are fully maintained, and several shipbuilding companies are still enlarging their yards. Power units and miscellaneous manufacturing equipment are in good demand. Agricultural machinery continues very strong, and oil companies are buying freely for well development and refineries. Exports from San Francisco in October were the largest on record, being valued at \$13,248,929.

The Union Works has let a contract for the construction of a three-story office building at Twentieth and Illinois streets, to cost \$157,500. Its buildings in course of construction at the Alameda shipbuilding plant are about completed.

The Imperial Foundry & Machine Works, Imperial, Cal., capitalized at \$25,000, will take over the machine shop of H. J. Elffer, and equip it to be one of the most complete foundry plants south of Los Angeles.

The City Council, Richmond, Cal., has called for bids for machine shop equipment for the fire department.

It is reported that a new company is to start up the Petaluma Foundry, Petaluma, Cal., under lease.

W. R. Grace & Co., San Francisco, have ordered two pairs of 320-hp. Bolinder Diesel engines for ships which will be built shortly at a Pacific port. They placed orders for four similar engines early in the year.

The Imperial Cotton Machinery Company, Los Angeles, Cal., has been incorporated with a capital stock of \$200,000 by J. P. Nealey, J. E. McDonald, H. Jones and others.

It is announced that the Moreland Motor Truck Company will erect a factory at Los Angeles.

The R. W. Pridham Company, Los Angeles, manufacturer of paper boxes, has secured a new factory site in that city.

The American Beet Sugar Company, Chino, Cal., is making improvements to its machine and blacksmith shops.

The Inlaid Floor Company is preparing to build a factory at Emeryville, Cal.

Texas

AUSTIN, TEX., NOV. 18, 1916.

Satisfactory reports have been received from the machinery and tool trade this week. Unusual activity of manufacturing and industry in general characterizes present business.

The Chicago, Rock Island & Pacific Railroad will build a 10-stall roundhouse at Amarillo.

It is reported that the Houston Lighting & Power Company, Houston, will enlarge and improve its electric light and power plant.

At a recent meeting of the stockholders of the Texas Company at Houston, the capital stock was increased from \$44,400,000 to \$55,500,000, the proceeds from the sale of this additional stock to be used for enlarging its refining, pipe line and other facilities.

The Magnolia Petroleum Company, with offices at Corsicana, Fort Worth and Beaumont, plans to increase its capital stock from \$20,000,000 to \$40,000,000, and will enlarge its pipe line, oil-storage and refining operations.

The City Commission, Galveston, will install another unit to the Alata Loma pumping station of the municipal water works.

The Atchison, Topeka & Santa Fé Railroad will build new freight terminals at Fort Worth.

It is authoritatively announced that the United States War Department will expend about \$1,600,000 in building and equipping a permanent aviation station at Fort Sam Houston. Major Ben D. Foulis is in charge.

The Pacific Northwest

SEATTLE, WASH., NOV. 14, 1916.

The car shortage in the Northwest, which is daily becoming more acute, is likely to completely paralyze the lumber industry unless relief is obtained promptly. Due to this shortage, stocks at the mills are accumulating rapidly, a dangerous market condition, were it not for the fact that the unshipped production is well covered by orders, and it is expected that the accumulating stocks will be worked down to normal as car supply improves. A fair volume of orders is reported by tidewater mills, with indications of heavy water shipping the remaining part of the year. Coastwise domestic lumber orders for the past week amounted to 12,810,703 ft. and export orders 7,028,500 ft. The unparalleled activity in shipbuilding in this district appears to be increasing almost daily. Two of the largest of these plants on Puget Sound have recently begun the installation of lighting systems which will enable them to be operated night and day.

Fifty-three wooden vessels designed for the lumber traffic are now in course of construction in Oregon, Washington and British Columbia. In the construction of these vessels approximately 105,000,000 ft. of lumber will be used, and when completed the vessels will have a combined lumber-carrying capacity of 79,500,000 ft.

In addition to these wooden ships now laid down or ordered, there are unconfirmed reports of contracts for 11 more wooden vessels. While the new tonnage is for the most part being built specifically for the lumber trade, comparatively few of the vessels in course of construction are to be operated by mill companies.

Demand for machinery, especially mining equipment and second-hand tools, is brisk. The unusually fine weather has afforded opportunities for outside construction remarkable in this section.

J. S. Emerson, Prince Rupert, B. C., is completing plans for installation of his proposed sawmill in that city. Plant will have capacity of 75,000 ft. daily.

A major interest in the McEachern-Standifer-Clarkson Ship Company of Astoria, Ore., has been purchased by A. O. Anderson & Co., Ltd., of Copenhagen, incorporated in the states of Oregon and New York. Guy M. Standifer and James Clarkson, Astoria, will retire from the company and will devote their interests to the Standifer-Clarkson shipyard on North Portland Harbor. The McEachern yard, situated on Young's Bay, is now building 7 auxiliary schooners of the five-masted type.

The Packard Logging Company, Seattle, which recently received contract for sale of 227,000,000 ft. of fir in the Olympic National Forest, is completing plans to log the tract at a cost of \$175,000. The necessary equipment will cost

\$40,000, and a railroad will be built into the timber immediately.

It is announced that the International Harvester Company of Chicago, Ill., will establish a branch distributing plant at Billings, Mont.

The Midland Lumber & Investment Company, Tacoma, Wash., has begun work on the rebuilding of its plant recently destroyed by fire. Included in the work will be a boiler house, sawmill and filing room, and several other structures. Plant will cost \$75,000.

The Canadian Robert Dollar Company, Vancouver, B. C., has purchased a 40-acre site on the north shore, upon which will be established a sawmill with daily capacity of 175,000 ft., and an 800-ft. dock. The plant, with purchase of site and necessary equipment, will represent a cost of \$200,000, and it is expected will be in operation in about four months.

It is stated that the sawmill plant of the American Export Lumber Company at Rainier, Ore., which was destroyed by fire with a loss of \$30,000, will be rebuilt.

A substantial interest in the Heath Shipbuilding Company of Portland has been purchased by Capt. Skaugen, a shipowner of Norway, who will also be general manager of the Oregon Navigation Company, a corporation closely allied to the Heath Company. The Oregon Navigation Company will enter actively into the business of building and operating vessels.

It is reported construction work will start immediately on the proposed packing plant to be built at Butte, Mont., by the Hansen Packing Company. It will be of brick and concrete, four stories, 125 x 250 ft., and will cost complete \$500,000. W. G. Hansen is general manager.

The Temple Shipbuilding Company, Seattle Wash., has been incorporated for \$100,000 by B. H. Temple, Vancouver, B. C.; W. L. Waters and F. J. Line, Seattle. It plans to establish a shipbuilding yard at Port Blakely, Wash., where wooden auxiliary powered vessels will be built.

The Hart-Wood Lumber Mfg. Company, Hoquiam, Wash., has awarded to the Matthews Shipbuilding Yards contract for a steam schooner to cost \$200,000, and have a lumber-carrying capacity of 1,200,000 ft. This is the second steamer to be built for the Hart-Wood Company this year. The vessel will be an oil-burner.

The Monarch Mills Company, Portland, Ore., has been organized with capital of \$750,000, by George F. Huesner, Lester W. David, R. J. Hubbard, and others, to take over the Monarch Mills in North Portland, costing more than \$1,250,000. The company owns 4,000,000,000 ft. of timber in Linn County, and present plans include the extension of the Oregon Electric Railway from Albany into the tract. It is reported a shipbuilding plant adjoining one of the mills of the company is also proposed.

Canada

TORONTO, NOV. 18, 1916.

C. F. Just, Canadian Trade Commissioner at Petrograd, states that the supply of agricultural machinery and implements in that country has been much commented upon lately, and that the subject has never before received so much attention. With the active co-operation of the Ministry of Agriculture, certain leading Zemstvos or municipalities, supported by a powerful financial institution in Moscow, have formed a central board for the purchase and distribution of agricultural machinery and implements in the districts represented. Mr. Just reports that the total requirements of the territories in question for 1917 are estimated at 96,800 machines, which include 45,000 reapers of foreign manufacture, 26,000 Russian lobogreikas, 15,000 mowers, 9000 horse rakes and 1800 binders. Siberia is also a potential market to be taken into consideration, where the need of agricultural machinery is even greater than in any part of Russia proper.

Boeckh Brothers & Co., 164 Adelaide Street West, Toronto, are in the market for a wood shaping machine.

Work will be commenced at an early date on the erection of a plant at Mimico, Ont., for the Dominion Abrasive Wheel Company, Ltd., to cost \$65,000. The Toms Contracting Company, 501 Kent Building, Toronto, is the contractor.

The Packard Electric Company, Mill Street, St. Catharines, Ont., will build a machine shop to cost \$3,000.

The American Can Company, Hamilton, Ont., will build an addition to its plant, of brick and steel construction, to cost \$25,000.

The Dominion Cutlery Company, Ltd., 591 St. Catharine Street, Montreal, will build a factory.

The Canadian Tractor Company proposes to build a plant at Whitby, Ont., to cost \$60,000. Details may be obtained from Guy R. Creelman, Fenton, Mich.

The Perfect Machine Company, Galt, Ont., will erect an addition to its foundry to cost \$3,000.

The Guelph Stove Company, Guelph, Ont., will erect a plant including a foundry, to cost \$8,000. W. A. Mahoney, St. George Square, is the architect.

The Under Ground Cable Company of Canada, Sherman Street, Hamilton, Ont., will commence work at once on the erection of a mill and frame addition to its plant to cost \$30,000.

The Town Council, Penticton, B. C., will purchase an engine for its electric plant. B. C. Bracewell is clerk.

The sash and door factory of Adelard Paquette, St. Hughes, Que., was destroyed by fire with a loss of \$20,000. It will be rebuilt and machinery for steam power will be purchased.

The Town Council, Ingersoll, Ont., will grant concessions to a company which proposes to establish a plant at a cost of \$200,000 for the manufacture of rubber tires, etc. Particulars may be obtained from Mayor Elliott.

The plant of the Lake Megantic Electric Company, Lake Megantic, Que., which has been totally destroyed by fire, will be rebuilt. Steam power equipment will be required.

The Chicoutimi Pulp Company, Chicoutimi, Que., will build an addition to its plant and increase its output from 80,000 to 130,000 tons of pulp per year. J. E. A. Dubec is manager.

The Colonial Pulp & Paper Mills, Ltd., Quatsino Sound, Ont., will build a sulphite plant to have a daily capacity of 120 tons per day. The first unit will have a daily capacity of 60 tons. The installation will be completed in about a year.

The Canadian Cartridge Company, Hamilton, Ont., will erect an addition to its plant to cost \$13,000.

The North Bay Toy Company, North Bay, Ont., is making arrangements for the erection of a factory to cost \$15,000.

The harness factory of Adams Brothers, King and Frederick streets, Toronto, was damaged by fire, Nov. 15, with a loss of about \$100,000. The erection of a new factory on King Street West, estimated to cost \$75,000, has been commenced.

Plans are being prepared for a reinforced concrete machine shop and roundhouse, estimated to cost \$150,000, for the Pacific Great Eastern Railway Company at Lillooet, B. C. A. H. Sperry, Vancouver, B. C., is general manager.

The Orangeville Lime & Cement Company has purchased a tract of land at Teeswater, Ont., and will erect a plant to cost \$75,000.

The Franklin Company, Winnipeg, proposes to make additions to its plant estimated to cost \$1,000,000. H. H. Franklin is president.

The Brompton Pulp & Paper Company, Ltd., Montreal, has been incorporated with a capital stock of \$9,000,000 by Errol Languedoc, Ralph E. Allan, Pierre Charbonneau, and others.

The Packard Fuse Company, Ltd., St. Catharines, Ont., has been incorporated with a capital stock of \$200,000 by Ralph B. Hamilton, George C. Rough, Samuel R. Cruikshank, and others, to manufacture fuses, projectiles, etc.

McKelvie & Birch, Ltd., Kingston, Ont., has been incorporated with a capital stock of \$50,000 by John McKelvie, William H. Warren, Colin A. Macpherson, and others, to manufacture plumbing, heating and electrical goods, etc.

The Dominion Thresher Company, Ltd., New Hamburg, Ont., has been incorporated with a capital stock of \$40,000 by William A. Bailey, Isaac W. Kingswood, both of London, Ont.; William R. Miller of Hamilton, and others, to manufacture farm implements, threshing machines, traction engines, etc.

J. Coughlan & Sons, Vancouver, B. C., have received an order for the construction of two steel steamers for Norwegian interests.

The Dodge Mfg. Company, Ltd., Toronto, has been incorporated with a capital stock of \$1,500,000 by Charles F. Wheaton, 122 Bedford Road; William G. Thurston, 23 Toronto Street; Francis H. Snyder, and others, to manufacture machinery, implements, etc.

The Dominion Boiler & Foundry, Ltd., Montreal East, has been incorporated with a capital stock of \$200,000 by Charles W. Webb, Joseph H. Charbonneau, Victor Pelletier, and others, to manufacture furnaces, radiators, boilers, etc.

The Revolving Wardrobes Company, Ltd., Toronto, has been incorporated with a capital stock of \$50,000 by Robert J. W. Baker, John S. Denison, 156 Yonge Street; Leonard A. Richard, and others, to manufacture furniture, etc.

The Eclipse Plating & Sales Company, Ltd., Ottawa, has been incorporated with a capital stock of \$50,000 by John Dornier, Philip M. Grimes, Frederick D. Hogg, and others, to manufacture electrical supplies, etc.

The Electrograph Company of Canada, Ltd., Winnipeg, has been incorporated with a capital stock of \$100,000 by William B. Houston, Ora M. Baker, Winnipeg; Andrew J. Tallman, Toronto, and others, to manufacture engines, machinery, electric or gas heaters, etc.

The Hamilton Steel Wheel Company, Ltd., Hamilton, Ont., has been incorporated with a capital stock of \$2,000,000 by John R. Marshall, George A. Young, Amy H. Johnson, and others. It will build a plant at Hamilton at an early date for the manufacture of wheels, rolling stock, etc.

Baines & Peckover, steel merchants, Toronto, have secured a site of one and one-half acres in the Toronto harbor industrial district and will erect a plant to cost \$225,000.

Government Purchases

WASHINGTON, D. C., Nov. 20, 1916.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until, date not set, schedule 381, for one 5-hp. induction motor and schedule 383, for one 40-ton platform scale, all for Washington; schedule 381, for one single-stage iron-casing centrifugal pump for Indian Head; schedule 389, for sixteen 4-cycle gasoline engines for Portsmouth; schedule 390, for two grinding machines and one grinding outfit for grinding primer stocks, all for Newport; schedule 391, for one grinder and cutter, one 18-in. x 12-ft. lathe, one 10-in. engine lathe, one 3 x 36-in. turret lathe, one 16-in. engine lathe, one 60-in. boring, drilling and milling machine, two belt-driven single-spindle sensitive drilling machines, two grinding machines, one 10 x 24-in. grinding machine, one heavy milling machine, one universal milling machine and three bench milling machines, all for Washington; one disk grinder and roll sander, for Boston; schedule 395, for miscellaneous plunger pumps for Brooklyn.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, Nov. 14 for supplies for the navy yards as follows:

Schedule 312, Construction and Repair.

Class 101.—Three pipe-threading machines, Carroll Electric Company, \$876, \$516 and \$920; Jarack Mfg. Company, \$1,366.50; Kemp Machinery Company, \$1,422; Landis Machine Company, \$3,169.57; Manning, Maxwell & Moore, Inc., \$1,720; Frank Toomey, \$1,628.77.

Schedule 321, Ordnance

Class 121, Washington—One horizontal boring, drilling and milling machine, Lucas Machine Tool Company, \$5,812; Niles-Bement-Pond Company, \$4,883.

The purchasing officer of the Panama Canal, Washington, will soon call for bids for two centrifugal pumps of 350 gal. per minute capacity each, with accessory equipment.

NEW TRADE PUBLICATIONS

Hydraulic Valves and Fittings.—Watson-Stillman Company, 190 Fulton Street, New York City. Catalog No. 94 superseding No. 78. Size, 6 x 9 in.; pages, 96. Points out advantages of using the company's line of bronze and forged and cast steel valves and fittings for hydraulic work. The catalog is divided into sections dealing with pipes and fittings and safety, check, stop, operating, by-pass and regulating valves. In the different parts a single page is devoted to each particular valve or fitting with an illustration, a brief description and a table of the sizes that can be supplied. Mention is made of a number of special valves and combinations which can be furnished, together with illustrations of valve reseating tools and leather packings. A number of tables of useful information are included.

Water Tube Boilers.—E. Keeler Company, Williamsport, Pa. Catalog. Describes and illustrates a water tube boiler with vertical baffle walls employing either coal or oil as fuel. The details of construction and equipment are gone into at some length, the text being supplemented by a number of engravings of the different parts. Views of installations are included and the advantages of wrought steel construction, dry steam and free circulation are pointed out. Tables giving the results of a number of tests of the boilers are presented. Mention is made of a cross drum and a horizontal return tubular type of boiler.

Gas Engines.—Chicago Pneumatic Tool Company, Fisher Building, Chicago, Ill. Bulletin No. 34-X. Concerned with a line of horizontal two-stroke cycle straight-line engines with cross-head. A brief statement of the advantages of using a gas engine as a source of power is presented, followed by a description of the construction of the engine, the text being supplemented by a number of engravings of the various parts. Illustrations of the complete engine are presented, together with tables of specifications for the different sizes that are built.

Silent Chain.—Link-Belt Company, Thirty-ninth Street and Stewart Avenue, Chicago, Ill. Bulletin No. 282. Shows

installations of the company's silent chain in the plant of the Schoellkopf Aniline & Chemical Works, Inc., Buffalo, N. Y., where 1000 drives are transmitting from $\frac{3}{4}$ to 5 hp. A view showing the leather belt drive formerly employed for operating aniline kettles is presented by way of contrast with the motor and silent chain drive now employed. A brief description of the chain, in which emphasis is laid upon a patented pin-bushed joint, is presented.

Reamers and Boring Tools.—Kelly Reamer Company, Cleveland, Ohio. Catalog G. Relates to a line of reaming and boring tools for steel, bronze, iron or aluminum equipped with adjustable high-speed blades. The various reamers of the turret, cylinder, floating and adjustable types are illustrated and briefly described, with tables of the sizes in which they can be supplied. A number of views of the tools in use are included and directions for using and caring for them are presented.

Forging Furnaces.—Tate, Jones & Co., Inc., Pittsburgh, Pa. Circulars Nos. 149-A and 150. Deal with forging furnaces of various sizes. Those in the first circular are designed for heating billets for large hammer and press work and for medium-sized forging work, while those in the other are smaller and are particularly adapted for rapid heating of work to high temperatures for forging machines, drop hammers, forging presses, etc. Views of the various sizes of furnace, which employ oil or gas as fuel, are presented, with lists of the standard sizes that can be furnished. Descriptions of the construction of the furnaces and installation views are included in both circulars.

Grab Bucket Cranes.—Alfred Box & Co., Philadelphia, Pa. Bulletin No. 600. Illustrates a line of cranes operating a standard two-line grab bucket by using only four steel spur gears, two drums, one motor and one standard controller. The special features of the cranes, such as all steel construction, fewer and readily accessible parts, rapid operation and the use of safety hooks in addition to the king bolts, are mentioned. The bulk of the bulletin is, however, made up of $9\frac{1}{2}$ x 12 in. illustrations of the different styles of cranes with brief descriptions. Dimension diagrams and tables of the buckets employed are presented, and a number of views of installations are included.

Telautograph Systems.—Telautograph Corporation, 111 Broadway, New York City. Folder. Pertains to the use of the Telautograph as a means for transmitting messages from a central point, such as the superintendent's office, to the various departments of an industrial establishment or between the several departments. Emphasis is laid upon the fact that the messages are received at once in the original handwriting of the sender, thus giving a record that is as true as a carbon copy, in addition to saving time, irrespective of the distance between the two points. A diagram of a typical installation and an engraving of the instrument are included.

Speed-Regulating Rheostats and Panels.—General Electric Company, Schenectady, N. Y. Bulletin No. 48,320. Embodies illustrations and brief descriptions of a line of rheostats and panels designed to control the speed of direct-current series wound motors by armature regulation and shunt or compound wound motors by either armature or field regulation, or a combination of both, with dimension diagrams and tables of the different pieces of apparatus. A discussion of the relative advantages of rheostats and panels is presented, followed by brief descriptions of rheostats for regulating speed by field control combined with armature starting, by armature control only and by combined armature and field control. Mention is also made of the two types of panels supplied.

Pneumatic Tool Lubricators.—Chicago Pneumatic Tool Company, Fisher Building, Chicago, Ill. Bulletin No. 130, third edition. Lists a line of lubricators for pneumatic tools which includes automatic oilers for use in connection with all classes of pneumatic hammers, rock drills, etc., and a grease machine for supplying grease to the gears of drilling machines through the dead handle opening. The advantages of thorough and systematic lubrication of the tools are briefly touched upon and mention is made of a line of greases and oils known as Airollene lubricants for use with the company's tools.

Gears.—Van Dorn & Dutton Company, Cleveland, Ohio. Booklet entitled "Facts About Gears." Illustrates and describes various types of gears and is intended as a reference book for gear buyers. Tabulated data on gearing terms, drawings and specification formulae for every type of gear are presented. Illustrations of the different styles of gears are presented with references to the pages upon which specifications of each will be found. The gears covered include spur, mitre, spiral, bevel and worm types, racks and pinions, sprockets and rawhide pinions. A number of tables of useful information, including circular and diametral pitches, decimal equivalents, weights of round bars and circumferences and areas of circles are included. Drawings showing the comparative size of gear teeth are presented.

